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SULGRAVE MANOR HOUSE*

THE Sulgrave Institution of Great Britain and America has for its object the promotion of an Anglo-American understanding, and is widely supported in both countries. During the ten years of its existence it has carried out the following work: the purchase, partial restoration and furnishing of Sulgrave Manor, the organization in 1913 of the celebration of the centenary of the Treaty of Ghent (the precursor of one hundred years of peace between England and America), the organization of the Tercentenary of the Pilgrim Fathers (1920), the initiation of Britain's Day Celebration in the United States, the foundation of the first Chair of American History in England, the publication of over twelve historical and other works on Anglo-American relations, the placing of the St. Gaudens monument of Lincoln opposite Westminster Abbey, and the presentation of a statue of Lincoln to Manchester, a Lincoln memorial to Hingham, Norfolk, the initiation of a gift of a Washington statue from the State of Virginia to the British people, and that of a Washington bust to St. Paul's Cathedral, as well as the promise of busts of Chatham and Burke to the American people. It is proposed to raise another £50,000 in this country for the more effective organization of the movement, for completing the furnishing and restoration of the Manor House, for founding scholarships in America for British boys and in England for American boys, together with traveling scholarships for journalists, and for the development of the Manor House, Bredon's Norton, an adjacent property which has been bequeathed to the Sulgrave Institution by Mrs. Woodhall Martin, and is to be utilized as a center for Anglo-American conferences, study and research, and as a rest house for Americans visiting England.

The connection of the Washington family with Sulgrave dates back to Lawrence Washington of Northampton, of which town he was twice Mayor. He bought one of the two manors into which Sulgrave was divided on the dissolution of the religious houses by Henry VIII. for £321 14s. 10d. Sulgrave was held by his son Robert, who succeeded to it in 1584, but in 1610, with the con-

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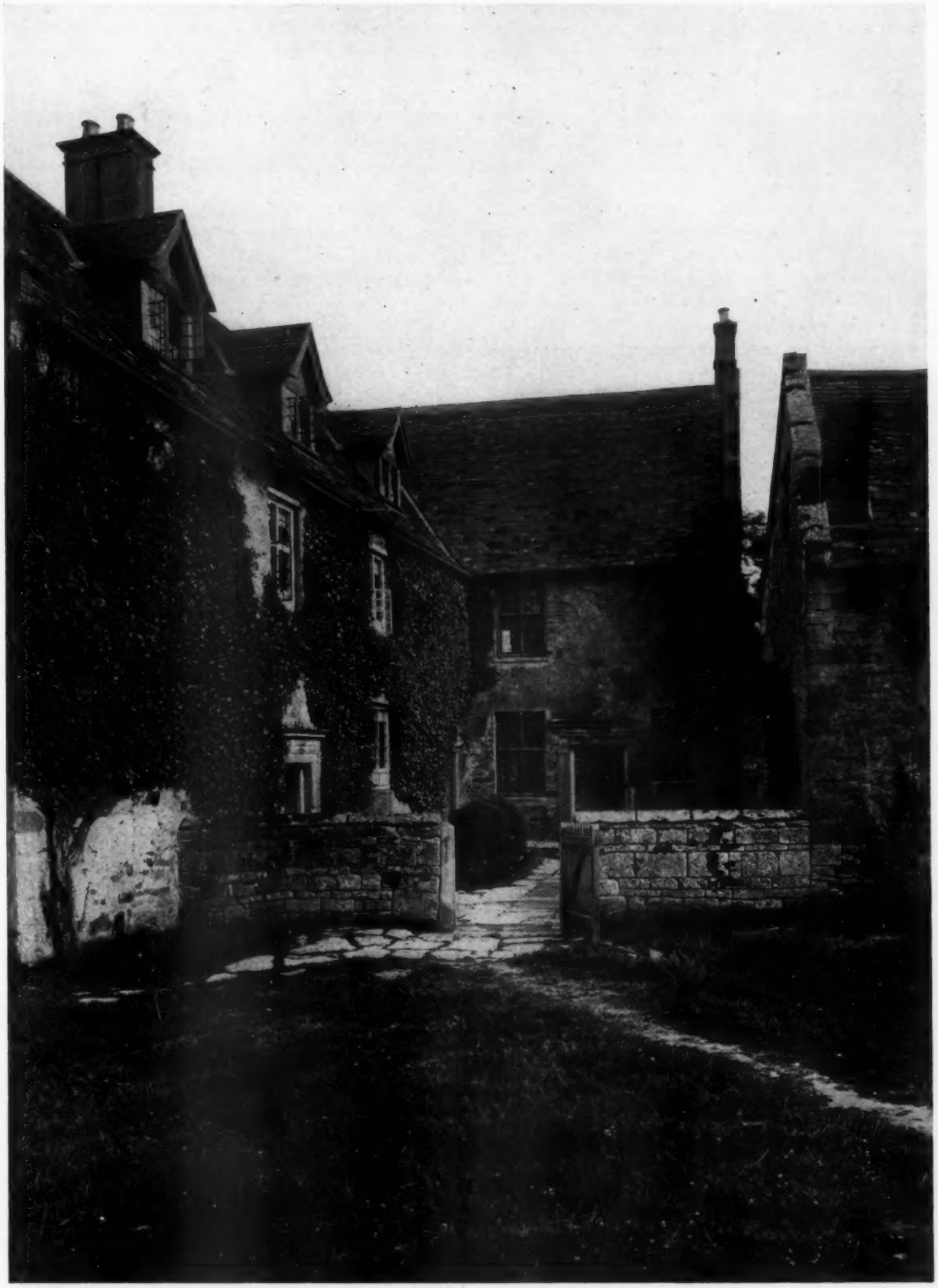
sent of his eldest son Lawrence, the Sulgrave estates were sold to his nephew, Lawrence Makepeace, of Chipping Warden, Northants. Here the connection between the Washington family and Sulgrave was terminated. Two more generations of the Washingtons lived in England, John Washington emigrating to America, where he died in 1677. Another period of two generations separated this John Washington from the George Washington who was born in 1732 and died in 1799. In George Washington were typified characteristics which were essentially English, and never more so than in the instincts which led him—typically conservative and aristocratic in temperament as he was—to become the great protagonist of England in the War of Independence. Maine in his work on the American Constitution has clearly shown how the founders of the United States felt it to be necessary to place every possible bar in the way of a hasty use of democratic powers. The Americans were in fact—like the barons in the reign of John—banded together to resent what they felt to be the abuse of constitutional rights; and it is this standpoint which differentiates the American Revolution from almost any other in the world's history.

Sulgrave Manor House stands at the east end of the picturesque village of Sulgrave in the southwestern part of Northamptonshire, not far from the borders of the counties of Warwick, Oxford, and Buckingham.

The Manor House, at the eastern extremity of the village, is separated from the road by a field containing some old elms which formerly may have been part of an avenue. The house, a gabled limestone building of two stories, with dormer windows, is made up of two blocks at right angles, the south-southeast part consisting of a porch and gable, hall and bedroom, all forming part of the original work. The main entrance was through the porch, which has a four-centerd arch under a square head and label. In the two spandrels are the Washington Arms with the mullets and bars sunk instead of in relief, that on the left only having a crescent. Unfortunately this coat of arms has been damaged by the weather. Over the

The Dining Hall



The Courtyard, Sulgrave Manor, Brackley, Northants, England

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entrance on the outside is a shield embossed in plaster with the arms defaced, as they have been for at least one hundred and thirty years. Above this is a window surmounted in the gable by the Royal Arms which display the lilies of France and the lions of England quartered all within the garter and supported by dexter a lion, sinister a dragon. Over this is some embossed plaster work and the letters "E. R.," and the Tudor rose and the French fleur-de-lys appear in close conjunction with the coat of arms. Evidently the initials stand for "Elizabeth Regina." Also inside the porch, embossed roughly in plaster, is a lion on one side, and on the other a dragon.

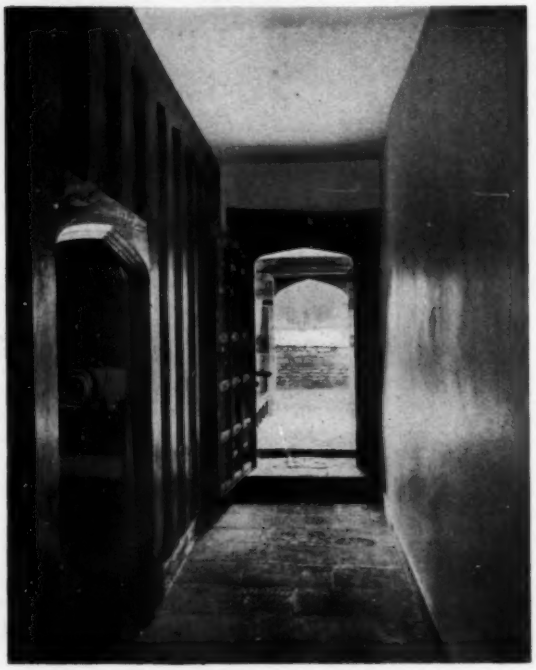
A Bedroom

The passage, or "screens," from the porch straight through to the back door was about five feet wide. The original back door from the "screens" to the court has been removed, and a doorway in the style of about 1700 has been substituted a little more to the east. The original hall to the east of the "screens" remains, but it has been divided. Originally it was about twenty-four and a half feet in length by eighteen feet in width. At the east end is a fireplace seven feet in width under a mutilated four-centered arch.

The wing which stretches northward at right angles to the old hall is too far to the west to be part of the original design. It has no really ancient features in it, and on the ground floor is divided into an oak staircase of well worked twisted balusters, an oak-panelled sitting room and a kitchen. It is stated that at one time there was a large arch with a porter's lodge over it to the northwest of the present hall. If that is true then there must have been a court on the north side of the hall with wings to the east and to the west of it. The wing to the east would contain the family apartments and that to the west the kitchen and buttery. The house was at any rate arranged, and at least partly built, on a large scale. Perhaps the original design was never completed, but from an old account written in 1789 it is known that part of the old buildings had been just recently pulled down.

It is interesting to note that the stars and stripes are founded on the basis of the arms of the Washington family which are described as Argent, Two Bars Gules, In Chief Three Mullets of the Second.

The pieces of furniture in the dining room and bed chamber are all fine contemporary pieces contributed by various people. Amongst these may be mentioned the late Lady Paget, Lord Furness, Lady Sackville, Lady Cunard, Mr. Pierpont Morgan, Mrs. Whitelaw Reid, and the Stars and Stripes Club of Manchester, which gave us the fine bedstead in the upper chamber. Amongst numerous other gifts are a fine bronze bust of Washington (copied from the Houdon original) presented last June by the Sulgrave Institution of America, British and American flags presented by the British Pilgrims and American organizations, and various deeds and letters signed by



Porch and Door

George Washington and members of his family.

The grounds around the Manor House have been newly laid out by Sir R. Blomfield, and there will soon be a very beautiful old English garden surrounding the place. The two chief features of interest on the outside of the building are the Washington Arms on the right spandrel of the main doorway on the south front, and the Tudor Arms in the gable over the same doorway. These are objects of continual interest to the many American and other visitors who now visit Sulgrave Manor.

It will be seen from what has been said that the Washington family were only connected with the old property of Sulgrave for a brief period of its history; but to Americans, who more than any people value associations, it affords the most tangible link between the Washingtons as an English family and the great Virginian, and it is, and will be, more and more a place of pilgrimage for Americans in England. It is, therefore, wholly appropriate that it should in these later days form the center of a great association, having for its object the furthering of good understanding and international friendship which, but for the unhappy mistakes of our forefathers, would have kept the English speaking race an indivisible unit.

The Ante Room

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Fig. 1. Sixth Century Byzantine Mosaic from San Vitale, Ravenna

STAINED GLASS—II. HISTORICAL PERIODS

BY JOSEPH G. REYNOLDS, JR., Craftsman

IN considering the history of stained glass it is helpful to divide the time during which it was produced into periods. Such a division must of necessity be more or less arbitrary, for no hard and fast date can be set down as marking the end of one style and the beginning of another. But in this article our interest in the history of the art of window making lies in studying the salient characteristics, and comparing the relative artistic merits, of each style.

For the sake of convenience, then, let us divide this era into six periods:

1. Earliest glass—late eleventh and early twelfth centuries, Byzantine in style
2. Twelfth century—Byzantine and Romanesque in style, found in round-arched windows of the architecture of the period
3. Early Gothic—thirteenth century
4. Middle Gothic—transitional glass of the fourteenth century
5. Late Gothic—fifteenth century
6. Renaissance—of which the finest was made in the first half of the sixteenth century

Earliest Glass
Late Eleventh and Early Twelfth Centuries
(*Byzantine in Style*)

The Byzantine artist combined the Oriental love of elaborate detail with the severity and dignity of design of the Greek. He cared little for a faithful imitation of nature but preferred to express himself by traditional symbols and conventions. He worked in line and flat tones rather than in chiaroscuro. His art was essentially decorative rather than pictorial, (Fig. 1). These Eastern and Hellenic influences and traditions were inherited by the early workers in glass.

There are comparatively few of the earlier windows in existence, the very earliest being in the Cathedral of St. Julien at Le Mans, France. Those at the western extremities of the north and south aisles are especially interesting for they are among the earliest examples of medallion windows. The subjects are from the legends of Sts. Gervasius and Protasius, two early Christian martyrs. The medallion shown on page 465, (Fig. 2) illustrates the martyrdom of St. Protasius. The Roman Prefect, robed in a brilliant white tunic

and a deep, velvety-toned mahogany-brown mantle, green cap and red socks, is seated on a dais, his right arm raised in command. St. Protasius in a wonderful gold tunic and blue mantle, his head surrounded by a gold nimbus, kneels while the executioner, dressed in a green robe and blue socks, grasps the martyr's hair in his left hand and wields the sword with his right.

The Hand of God in the attitude of the Greek kneel, and the palm trees that break across the background.

The whole composition shows a strong influence of the Byzantine traditions as evidenced by the use of pearls in the border, halo, trees, clouds, and canopy; also by the stiff attitudes of the figures, the clinging draperies with their peculiar angular folds, and the strong silhouette of the details against the background. The general design is

Fig. 2. Early Twelfth Century Medallion from the Cathedral at Le Mans

form of benediction and nimbed with blue, issues from the clouds above. While the ground behind the Prefect, who is seated indoors as indicated by the canopy, is blue, the background of the rest of the medallion, including the border, is ruby. The execution is taking place out of doors as shown by the grass and earth on which the figures stand and dignified and noble in its simplicity. There has been no attempt to imitate natural forms, either in drawing or color. All the details, even the hair and the faces of the figures, have been treated purely from the standpoint of design. The hair is either solid black, as in two of the figures, or little lines have been scratched out to indicate

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curly hair. No shading in tone is attempted; forms are indicated in line only. The trees are not real trees, but symbols of trees. Even in color there is nothing realistic about them. The trunks are white, the leaves and fruit bright blue, rich gold, and green.

The panel is, first of all, a masterly composition in color, a marvelous bit of decoration with a wonderful mellowness and richness of tone. Ruby and gold are woven in and through the whole design and are balanced by green and blue of just the right qualities. The ruby is deep and glowing and the blue is of that greenish azure quality not found after the middle of the twelfth century. In quality of design and color it is as splendid as any window of the great period. The greatest masterpieces of the twelfth century surpass it only in grandeur of scale.

Twelfth Century Glass

(Byzantine and Romanesque in Style)

Of the twelfth century glass much more remains than of the earliest period.* To this century belong the most beautiful windows that have ever been created. It was the Golden Age of stained glass in which individual masterpieces were produced; marvelous in design, glorious in color, with a charm that even today holds us spellbound.

The great central east window at Poitiers, here shown, (Fig. 3) disputes with Notre Dame de la Belle Verriére at Chartres the glory of being the finest window extant, the preference in color lying with the former.

The Poitiers window is about ten feet wide and twenty-six feet high. It contains three main subjects, the chief of which, the Crucifixion, occupies the central portion of the lancet. Upon a ruby cross, bordered with blue, is placed the figure of our Lord, the head surrounded by a cruciform nimbus, white with a gold cross. Standing at the foot of the cross on the left side are Mary, the Mother of Jesus, and the Roman soldier with the spear. On the right side are John, the Beloved Disciple, and the soldier with the sponge on hyssop. These figures are in blue, gold, olive-green, and a neutral red-violet on a brilliant ruby background. At the top of the window is the Ascending Lord—enclosed by an aureole or vesica piscis—adoring angels, one on either side, and below Him are grouped the apostles, looking upward.

At the bottom of this window is a quatrefoil enclosing a square medallion in which is shown St. Peter being nailed to the cross head downwards. In the semi-circular shape below are the donors presenting the window, to the left is Emperor Nero pointing to the scene in the right hand

Fig. 3. Twelfth Century Window from the Cathedral at Poitiers

* *The best examples are to be found at Poitiers, Chartres, Angers, S. Denis, and Vendome in France, and at Canterbury and York in England.*

semi-circle where St. Paul is suffering martyrdom. In the semi-circle above this square medallion is the empty tomb with the slumbering Roman soldiers, while in a square medallion to the left is the Angel of the Resurrection, and to the right, the three women who have journeyed from afar with spices.

The Byzantine influence may easily be traced in the general design and in the details of this window. But the most remarkable thing about it is its splendor of living, glowing color. No lover of color can stand before it without being thrilled with esthetic emotion to the very depths of his being. There is a most daring use of almost equal quantities of red and blue. And yet the proportions are so nicely adjusted, the qualities of the colors are so carefully selected and they are so well balanced by green and gold and white that one has no consciousness of a purple effect. Instead the ruby seems to become warmer and richer and the blue cooler and more intense because of their juxtaposition. And therein lies the marvel, as any one knows who has tried to combine large quantities of red and blue in the same design. The quality of the blue (which is described below) unquestionably is of significance in producing this rich harmony.

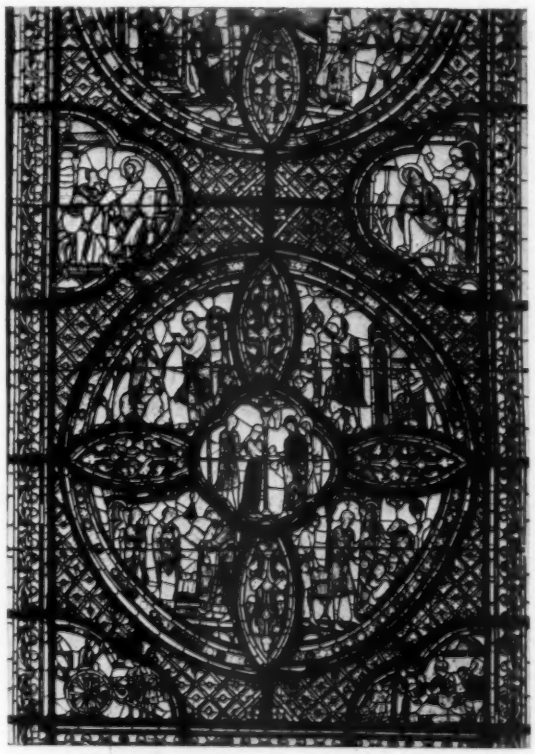

Fig. 4. Thirteenth Century Medallion Window from the Cathedral at Chartres

One instance of color arrangement is here worthy of consideration. The hair of the Crucified Christ in this window is blue. But being placed as it is on a white and gold halo and surrounded with such a large quantity of intense blue, the color of the hair is not noticed. It is safe to say that if it were any other color it would be noticed and would look wrong. On the other hand the hair of the Ascending Christ is a rich, brownish purple pot-metal. But the nimbus in this case is blue with a white cross. In such instances as this did the twelfth century craftsman show himself a master colorist.

Some of the outstanding characteristics of the design of twelfth century glass are the Byzantine-like details of the figures and drapery, the foliage and other ornament, which the reader may compare with the photograph on page 464. The straight saddle bars are wholly characteristic of this period, as are the square and circular medallions.

While the largeness of effect in the early windows is due first to the actual simplicity of the main lines of design it is also due to breadth and simplicity of color. The especial beauty and dignity of this work arises from the naive point of view of the mediæval glass worker. Instead of realism, he sought decorative effect, choosing splendor of color rather than stolid facts of tint or hue. The charm of color, then, though partly the result of age and corrosion is chiefly due to an instinctive realization of the beauty of the right proportions, combinations, and qualities of color. For example, there is a certain blue peculiar to this period which has been noted by all lovers of ancient glass. This color has been variously described as cobalt, cerulean, sapphire, azure, or a heavenly blue. It is a light rather than a dark blue and it has great intensity and purity of tone.* In conjunction with the warm ruby then used it never gave the unpleasant purple effect often found in later work.

The actual attainment of just the right combinations of colors seems all the more remarkable when we realize that the mediæval glass worker had no means of knowing how his window would look until it was finished and in place. Today we can assemble our windows before they are glazed and see them against the light by waxing them upon a large piece of plate glass, whereas in the early days they were unable to make sheets of clear glass large enough for this purpose.

Early Gothic Glass—Thirteenth Century

The great mass of early Gothic glass is of the thirteenth century. Many fine examples are to be found both in England and in France, though of

** This glass must have been of a remarkably fine quality for it seems to show practically no effects of corrosion.*

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course principally in France, the birthplace of the art.

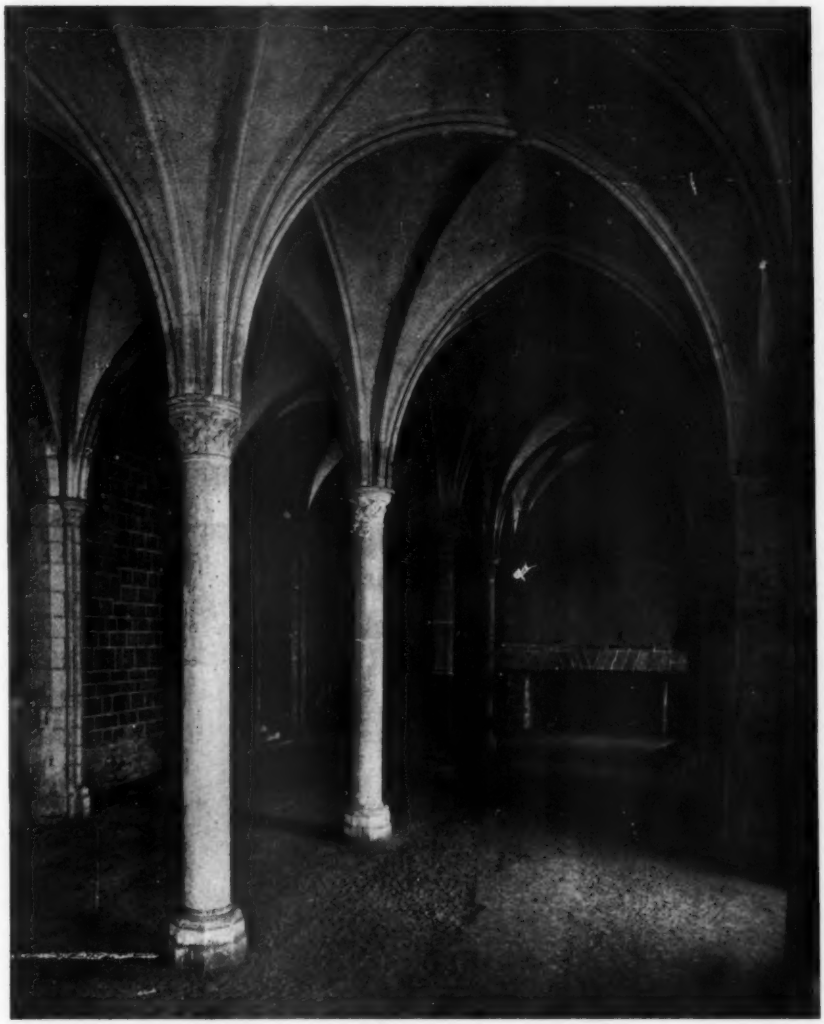
In passing from the twelfth to the thirteenth century one notices a certain loss of the restraint and sense of proportion which gives such dignity and refinement to the earlier work—but on the other hand a certain gain in facility of expression. The Byzantine influence is dying out. The thirteenth century man cares a little less for pure design and takes greater delight in story-telling in glass. He begins to elaborate his geometric medallion shapes, he crowds them with figures and introduces much more action into his subjects. But his glass is still strictly mosaic in character.

By comparing illustration, (Fig. 4)—a typical thirteenth century medallion window—with the two preceding illustrations, the changing tendencies in design may be noted. The medallions are here found to be no longer simple squares or circles and the heavy iron bars, instead of being either horizontal or vertical, are now shaped to the geometrical forms. Separate figure subjects are confined to the different compartments of the medallions and the medallions themselves have a geometrical pattern background. The Byzantine-like details of the figures and ornament have given way to a more naturalistic form of rendering. The attitudes of the figures are freer, the draperies less clinging and the folds not so angular. While details are still drawn in bold outlines a slight smear of paint is now often added to help give roundness or modelling to certain forms. The characteristic sapphire blue of the earlier work is now lacking and its place is taken by a deeper, greyer, less transparent shade. In late thirteenth century work the blue often merges toward purple and sometimes when in combination with ruby it takes on an unpleasant purplish cast, as has been previously mentioned. But the mediæval glazier was a colorist and he usually guarded against such a mistake by including in his color scheme sufficient green and gold and white to counteract this purple effect where it was not desired. Furthermore, the blue glass inserted by the modern restorer is often responsible for these inharmonious combinations of color.

The single lancets of the thirteenth century were filled in several different ways—either by single figure compositions, or by medallions, or a Jesse tree, or perhaps by grisaille patterns, or by plain white glass glazed with ornamental patterns. The clerestory was usually filled with huge figures under low topped canopies, surrounded by broad colored borders. The lower aisle windows, being nearer the eye were generally filled with medallions—figure subjects on a small scale. We also find the rose windows, sometimes over two lancets, as at Chartres and Bourges, and again in the transepts or the west end of the Cathedral.

(*To be continued*)

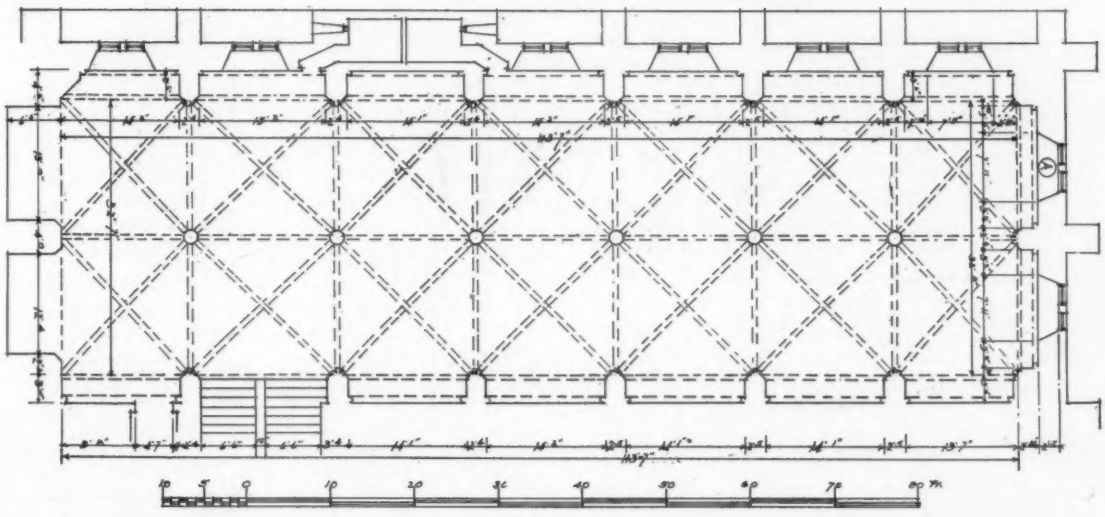
Entrance Gates, Chateau, Clantilly, France
(From a Photograph by R. M. Blackall)



Salle des Hotes, Mont St. Michel

THE Merveille situated beside the abbey Church of Mont St. Michel comprises, among others, three rooms of pleasing proportions: The Salle des Chevaliers, the Refectoire and the Salle des Hotes. "They are almost the only monuments of what must be called secular architecture of the early and perfect period of Gothic Art 1200-1210."

This room of the guests, called sometimes the Refectory, is divided by a row of columns into two naves or aisles and is a room of rare elegance. Here the Abbot received his strangers of great distinction and gave them his splendid dinners. There exists of this period "no room of more grace, of better proportions, of more delicate mouldings or of more interesting detail." The entire wall of one side is composed of bays with beautiful windows. Although a restoration, it has been admirably done and one can still feel the spirit of the room when filled with guests, the tables well replenished and the Abbot, a congenial host, entertaining his friends.



· SALLE · DES · HOTES · MONT · SAINT · MICHEL ·

MEASURED AND DRAWN BY R. M. BLACKALL, 35TH HOLDER, ROTCH TRAVELLING SCHOLARSHIP

THE AMERICAN ARCHITECT, SERIES II.
FRENCH AND ITALIAN DETAILS

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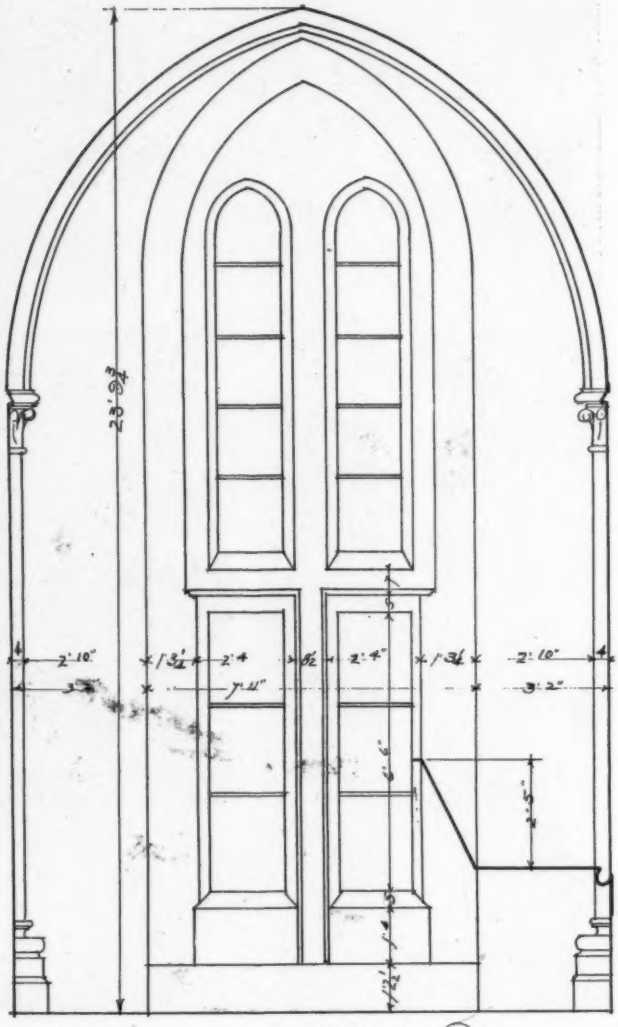

WINDOW (A)

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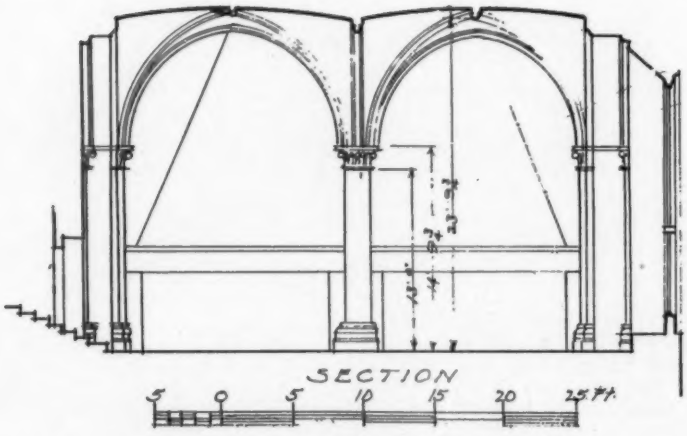

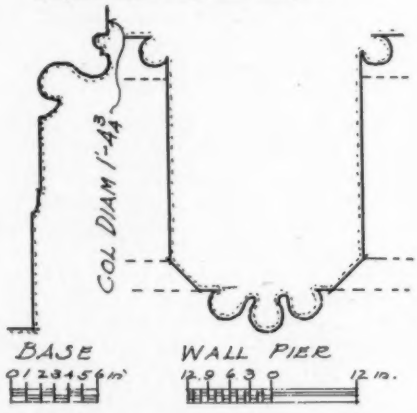

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THE AMERICAN ARCHITECT, SERIES II.
FRENCH AND ITALIAN DETAILS.

·EDITORIAL·COMMENT·

MORE THAN A YEAR AGO, this journal editorially commented on the action of the Associated General Contractors in formulating and adopting a code of ethics. This code had all the dignity and forcefulness of a professional statement. Just why it should have been a source of surprise in many quarters that a group of men engaged in the building industry should seek to bind its members to a strict ethical procedure, it is difficult to understand.

In every great industry in this country there is need for some formal code that will ethically control. While there are unwritten laws in all business, many of them are more honored in the breach than in the observance. They lack in being specific, and in organized industries, or those industries that have set up an executive group to govern all its members, some fixed rule and guide is necessary. Without it there can be no punitive measures unless the offender so far oversteps the ethics of his work as to bring him within the range of the penal code.

It is in the enforcement of a properly drawn code of ethics that any industry may hope to have the confidence and respect of those who patronize it.

In this connection it is interesting to receive from the American Academy of Political and Social Science a large sized pamphlet treating of the Ethics of the Professions and of Business.

Modern social and business relations are, to quote from this pamphlet, as manifold as they are far-flung. In the building industry the aloofness between the architect, bound by a code of ethics, and the building and other organizations that cooperate with him in construction no longer exists. Building operations are now as finely developed and as skillfully carried forward, as is the practice of architecture. It is, therefore, difficult to understand just why the architect alone should have until recently been ruled by a code of ethics and the related industries only by custom or unwritten laws.

The pamphlet referred to appears at a most timely moment. The building industry ever since the armistice has, as far as it could, been working to purge itself of those undesirable elements that have no conception of ethical conduct and are absolutely disinclined to follow such a code if it existed.

The often spoken allusion that a certain man's word is as good as his bond is to-day acquiring a new significance as a business asset.

Good faith in business (ethical conduct) has been brought forcibly to the attention of the business world by an unprecedented cancellation of contracts during a period when prices were rapidly rising and falling.

It became disheartening to note what small amounts of money would induce men to break their word. No modern enterprise may successfully proceed where there is lack of confidence. The structure may not endure when good faith and confidence are lacking.

To quote again from this interesting pamphlet, which should be read by every man who is engaged either in a profession or in business:

"In the past few months, many business men have come to have a solemn sense of personal obligation to restore and maintain faith in the business world. For ethics is the basis for creative industry. The National Association of Credit Men has adopted a formal code of ethics. The Associated Advertising Clubs of the World has started a 'Truth in Advertising' Movement and has formed a Vigilance Committee to enforce the truthful presentation of business facts in advertising. The 'Commercial Standards Council' was federated out of many large business associations to suppress bribery and to secure better ethical standards in business. The Rotarians have set for themselves the gigantic yet inspiring task of creating a code of ethics in every craft and business group throughout the country. And even the editors of newspapers have assured responsibility for a public profession as to their standards of conduct.

"As business groups and crafts struggle to put into words the ideals that shall guide their members when meeting the business temptations peculiar to each craft or industry, they, too, must turn away from mere negations to the ideal. And this ideal, as with the professions, must be the public good. These business groups, however, will not find at hand the same means for enforcing high standards of conduct that the professions have. There will usually be no selective training for the work performed, though the demand for such training is inereasing. But, on the other hand, business groups will have the powerful controlling agency of the organized market.

"The business world is now so complex that reliance must be its first watchword. And this can never be until the ideal of service controls the crafty impulse for profits."

For the regulation of business transactions be-

tween nations, corporations or individuals, there now exists a body of law effective and protective to a certain point. Beyond that the proper carrying forward on contract relations becomes one purely of ethics.

* * *

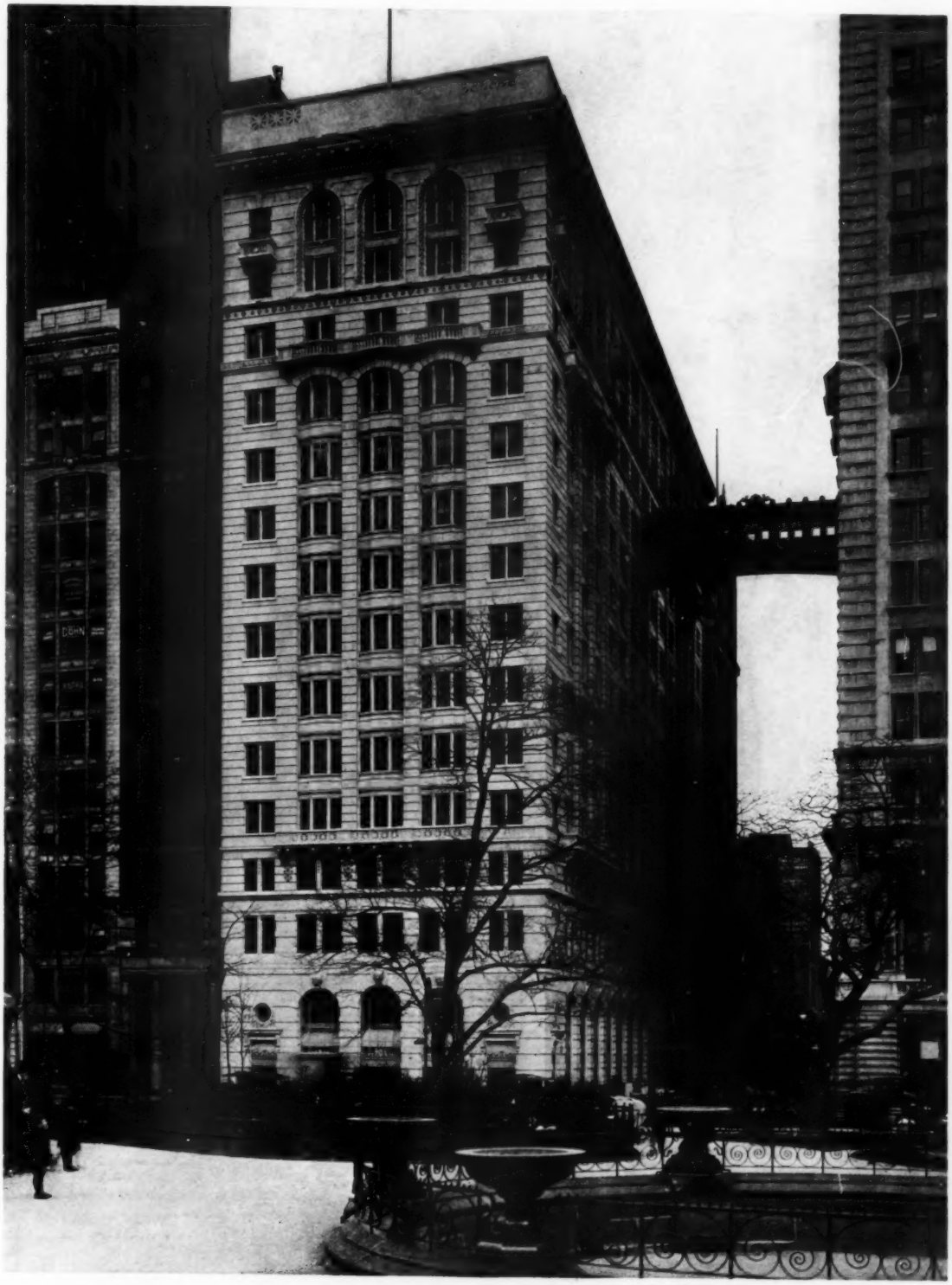
THE COURSE IN Plan Reading, recently conducted in Detroit under the auspices of the Michigan State Society, has proven to be of such great constructive value that it has been pronounced a decided success. Reference to this progressive movement on the part of the Michigan State Society has already been made in these columns. Now that the test of actual operation has proved the wisdom of the promoters, it may be a proper time again to direct attention to the great value of State organizations of architects, when efficiently conducted. There has, so we learn, been secured a fine spirit of co-operation between contractors in the building trades and members of the profession in Michigan.

It is interesting to learn from the report issued by the Committee of the Michigan State Society having these classes in charge, that a maximum attendance of 107 pupils comprised no less than 24 different grades of employment in the building trades. There were building superintendents, clerks, men from all of the various grades of labor, office managers, bookkeepers and salesmen.

The Associated Building Employers of Detroit, in a letter addressed to Mr. W. G. Malcomson, president of the Michigan State Society, express satisfaction at the outcome and include extracts from letters received from many men who attended the classes. One letter clearly states the exact value of such a movement. It says:

"As an experienced estimator who attended these classes, I want to say that I appreciated them for three reasons: One was, for their simplicity, although it must have entailed much thought and labor on the part of the architects in preparing them. Second, for a chance to get the architects' personal viewpoints, which many of us lack or do not have the opportunity to receive, and third—a better understanding of the other fellow's obstacles in construction work."

A House by Bulfinch at Pigeon Cove
From the original painting by Tom P. Barnett, Architect



VIEW OF ANNEX AT NORTHEAST CORNER OF MADISON AVENUE AND TWENTY-FOURTH STREET

ANNEX TO METROPOLITAN LIFE INSURANCE CO. BUILDING, NEW YORK CITY

D. EVERETT WAID, ARCHITECT

(Note: Photograph taken looking East from Madison Square. The corner of the Metropolitan Tower is seen at the right)

XUM

VIEW OF BRIDGE ACROSS TWENTY-FOURTH STREET

ANNEX TO METROPOLITAN LIFE INSURANCE CO. BUILDING, NEW YORK CITY

D. EVERETT WAID, ARCHITECT

XUM

DETAIL OF WINDOW ON TWENTY-FOURTH STREET

ANNEX TO METROPOLITAN LIFE INSURANCE CO. BUILDING, NEW YORK CITY

D. EVERETT WAID, ARCHITECT

XUM

MAIN ENTRANCE OF AUDITORIUM ON MADISON AVENUE

ANNEX TO METROPOLITAN LIFE INSURANCE CO. BUILDING, NEW YORK CITY

D. EVERETT WAID, ARCHITECT

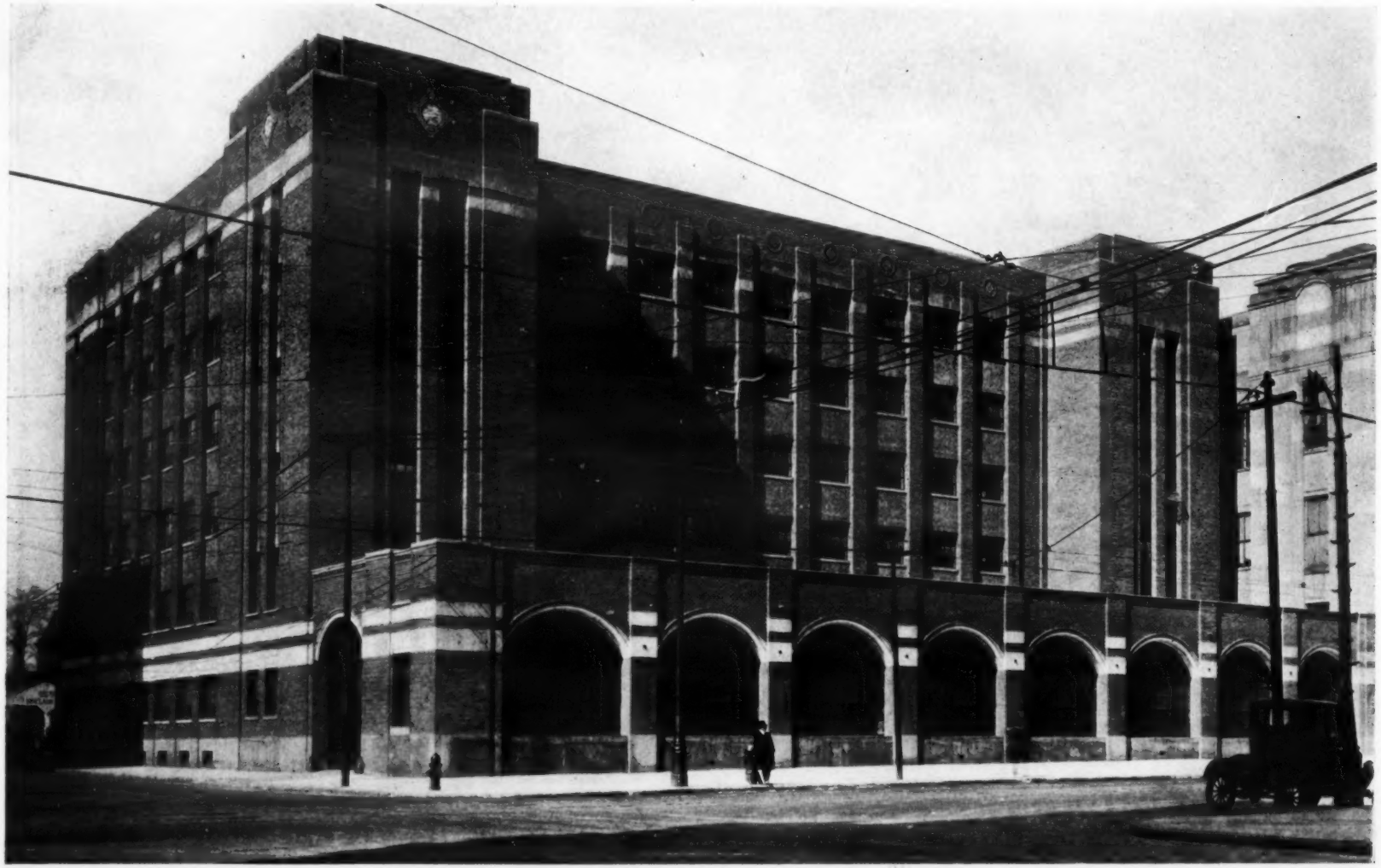
XUM

VIEW IN AUDITORIUM

ENTRANCE LOBBY OF AUDITORIUM

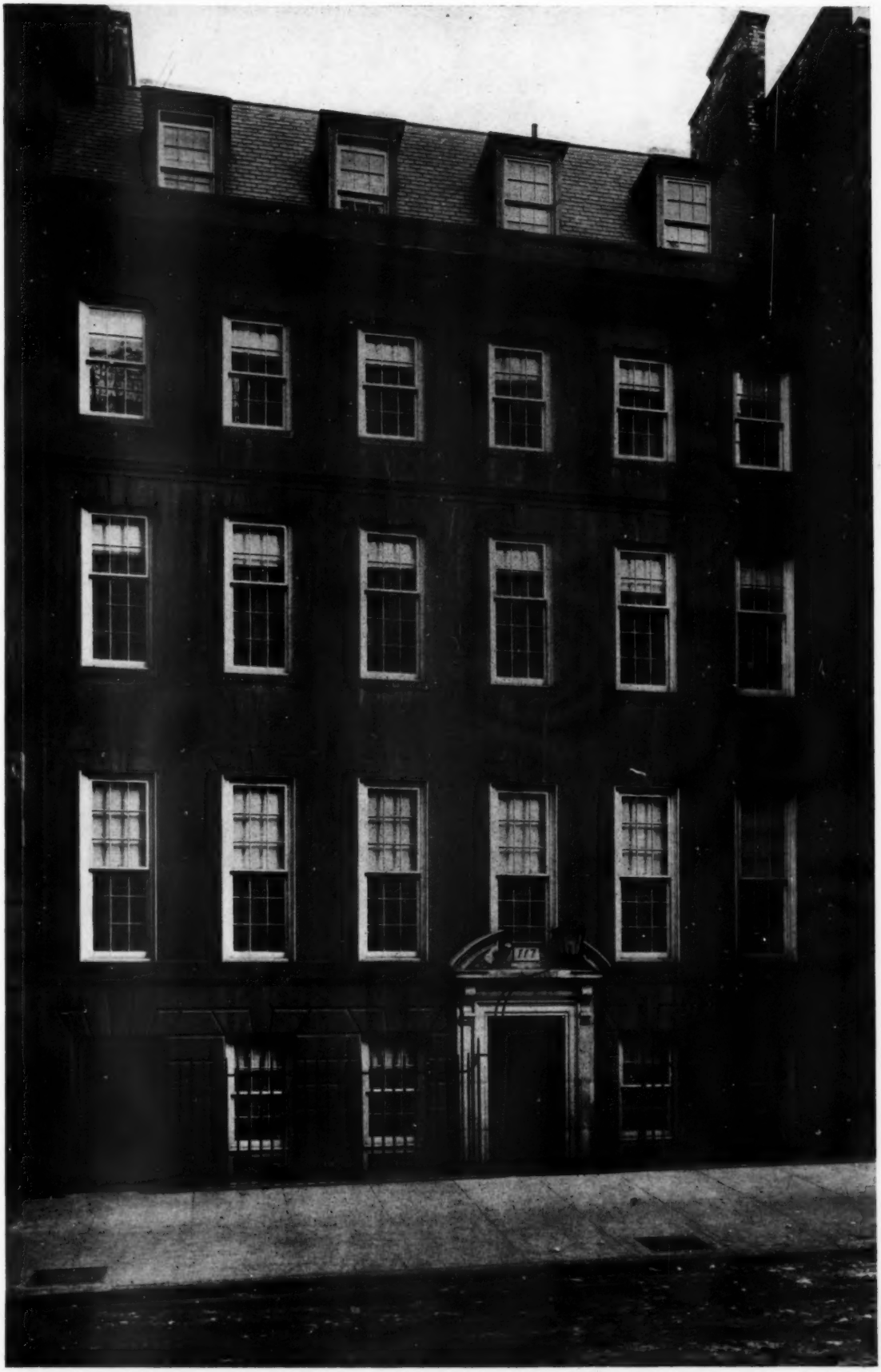
ANNEX TO METROPOLITAN LIFE INSURANCE CO. BUILDING, NEW YORK CITY

D. EVERETT WAID, ARCHITECT



EVENING NEWS WAREHOUSE BUILDING, DETROIT, MICH.

ALBERT KAHN, ARCHITECT



HOUSE OF A. A. FOWLER, ESQ., EAST 71ST STREET, NEW YORK

MOTT B. SCHMIDT, ARCHITECT

XUM

DRAWING ROOM MANTEL

DETAIL OF PRINCIPAL ENTRANCE

HOUSE OF A. A. FOWLER, ESQ., EAST 71ST STREET, NEW YORK

MOTT B. SCHMIDT, ARCHITECT

VOL. CXXI, NO. 2395 JUNE 7, 1922

DELTA KAPPA EPSILON CHAPTER HOUSE, ANN ARBOR, MICH.

GEO. W. MAHER & SON, ARCHITECTS

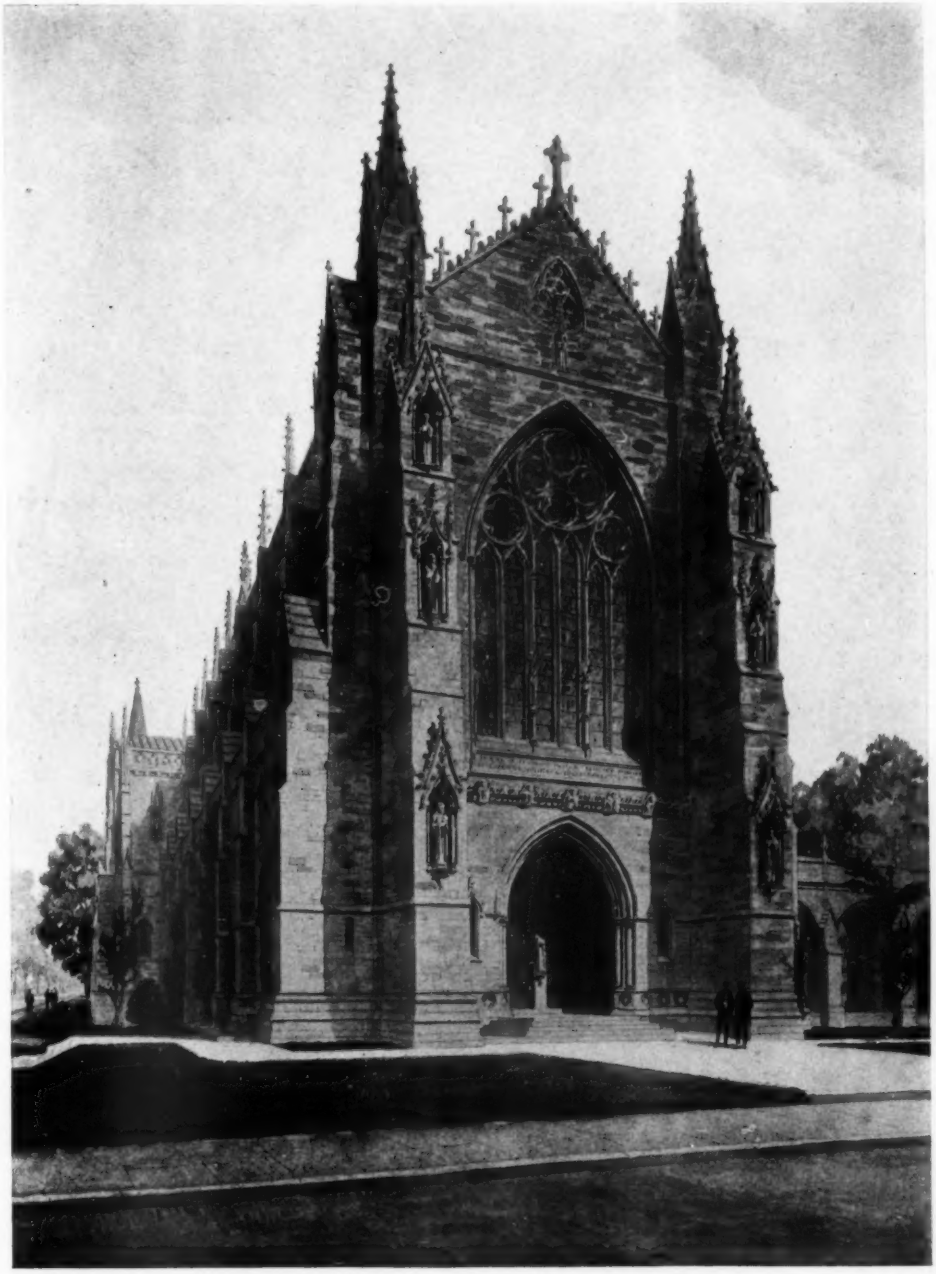
(From the Chicago Architectural Exhibition)

VOL. CXXI, NO. 2395 JUNE 7, 1922

HOME OFFICE, ILLINOIS LIFE INSURANCE CO., CHICAGO, ILL.

HOLABIRD & ROCHE, ARCHITECTS

(From the Chicago Architectural Exhibition)

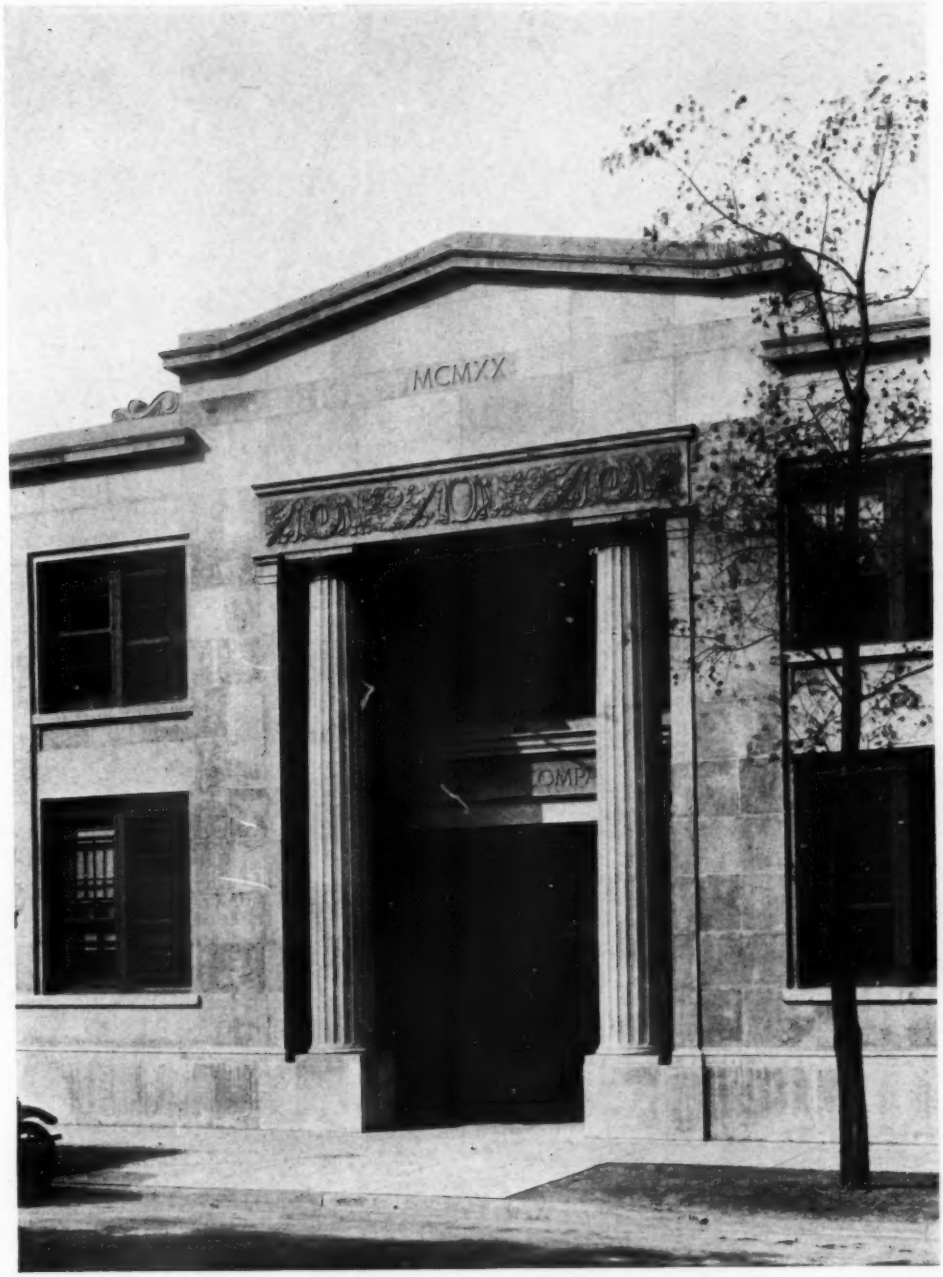


CHAPEL FOR PRINCETON UNIVERSITY

CRAM & FERGUSON, ARCHITECTS

(From the Chicago Architectural Exhibition)

XUM



ENTRANCE DETAIL, A. W. SHAW BUILDING

D. H. BURNHAM & CO., ARCHITECTS

(From the Chicago Architectural Exhibition)

XUM

VOL. CXXI, NO. 2395 JUNE 7, 1922

RESIDENCE, SUNSET ROAD, WINNETKA, ILL.

JAMES ROY ALLEN, ARCHITECT

(From the Chicago Architectural Exhibition)

STUDY OF NEW BUILDING
FOR THE HARTFORD CONNECTICUT TRUST CO.

B. W. MORRIS, ARCHITECT

(From the Chicago Architectural Exhibition)

XUM

VOL. CXXI, NO. 2395 JUNE 7, 1922

BARKER MEMORIAL BUILDING, HOME OF THE FRIENDLESS, PEORIA, ILL.

HEWITT & EMERSON, ARCHITECTS

(From the Chicago Architectural Exhibition)

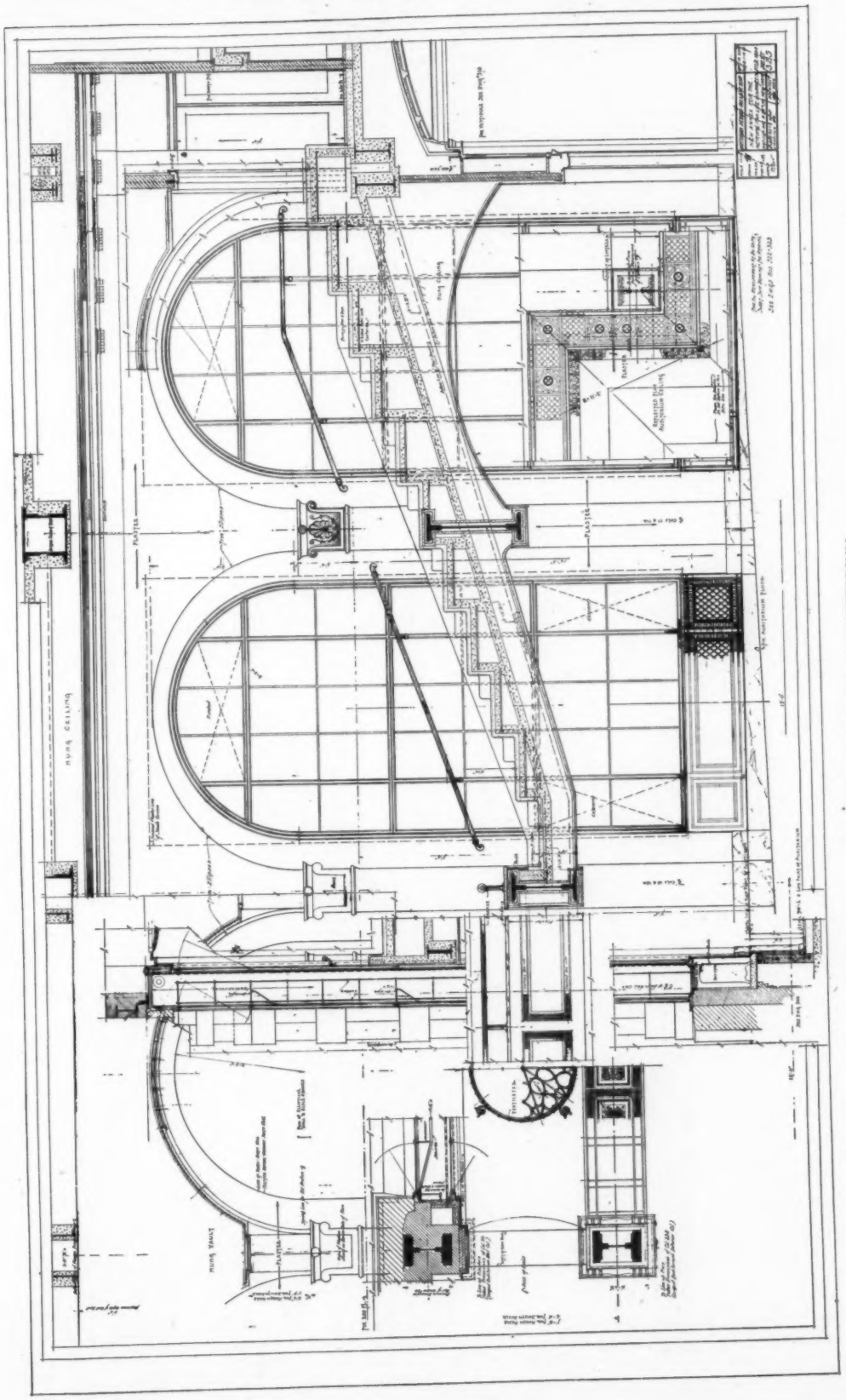
THE JOHN CRERAR LIBRARY BLDG., CHICAGO

HOLABIRD & ROCHE, ARCHITECTS

(From the Chicago Architectural Exhibition)

XUM

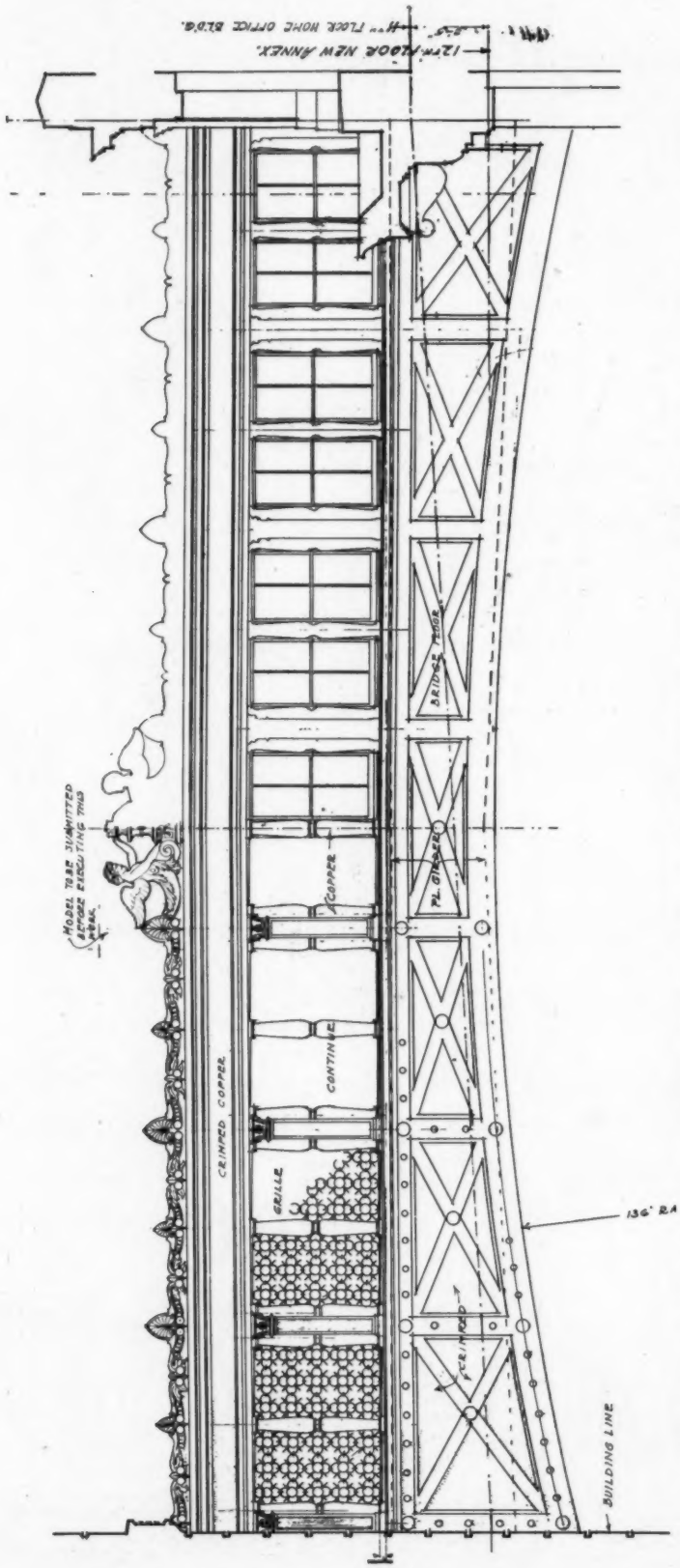
XUM



SECTION OF GALLERY IN AUDITORIUM

ANNEX TO METROPOLITAN LIFE INSURANCE CO. BUILDING, NEW YORK CITY

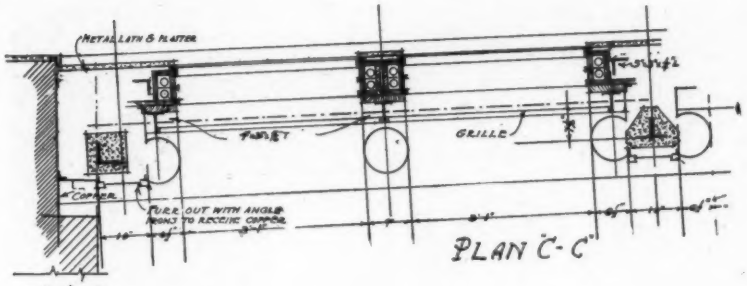
D. EVERETT WAID, ARCHITECT



ELEVATION OF BRIDGE ACROSS TWENTY-FOURTH STREET CONNECTING THE HOME OFFICE BUILDING WITH THE NEW ANNEX

ANNEX TO METROPOLITAN LIFE INSURANCE CO. BUILDING, NEW YORK CITY

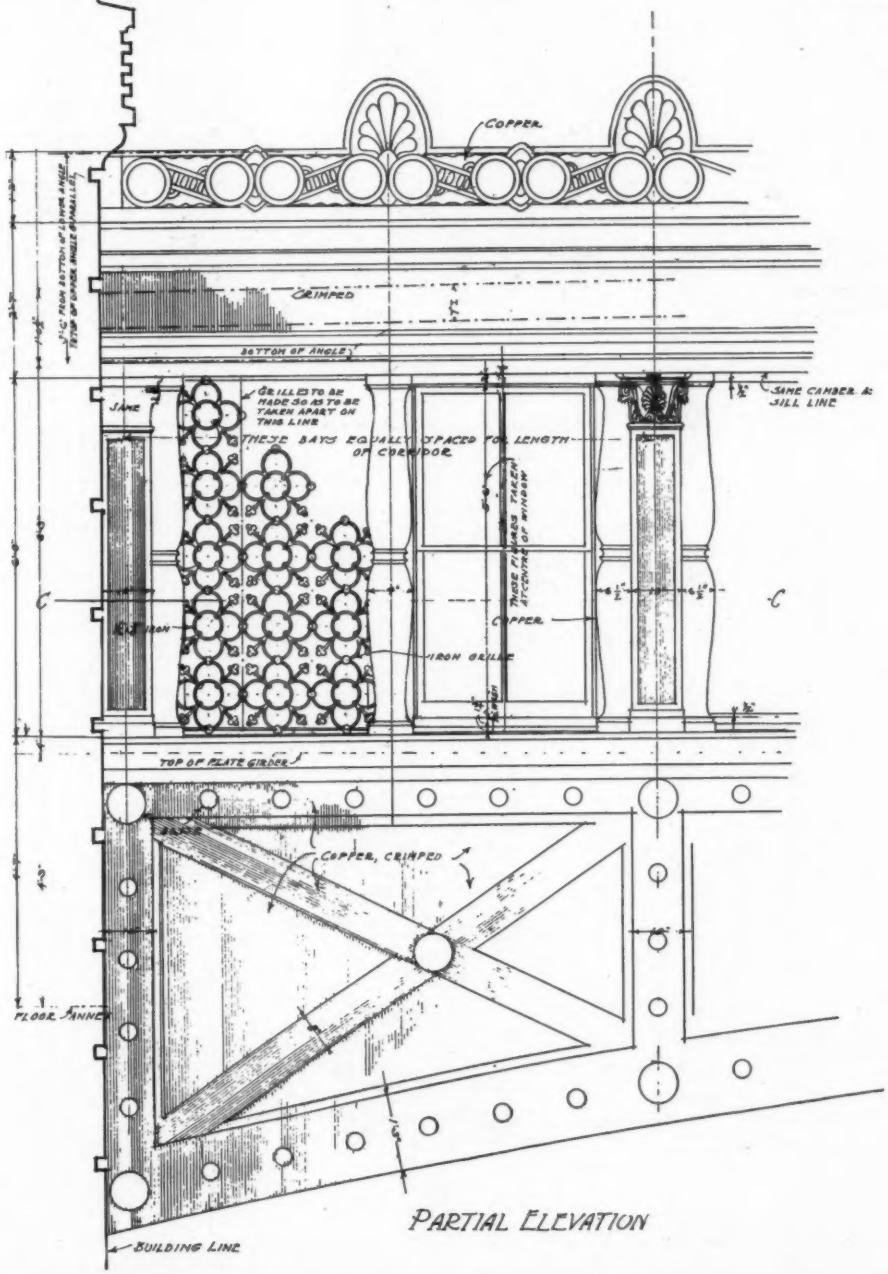
D. EVERETT WAID, ARCHITECT

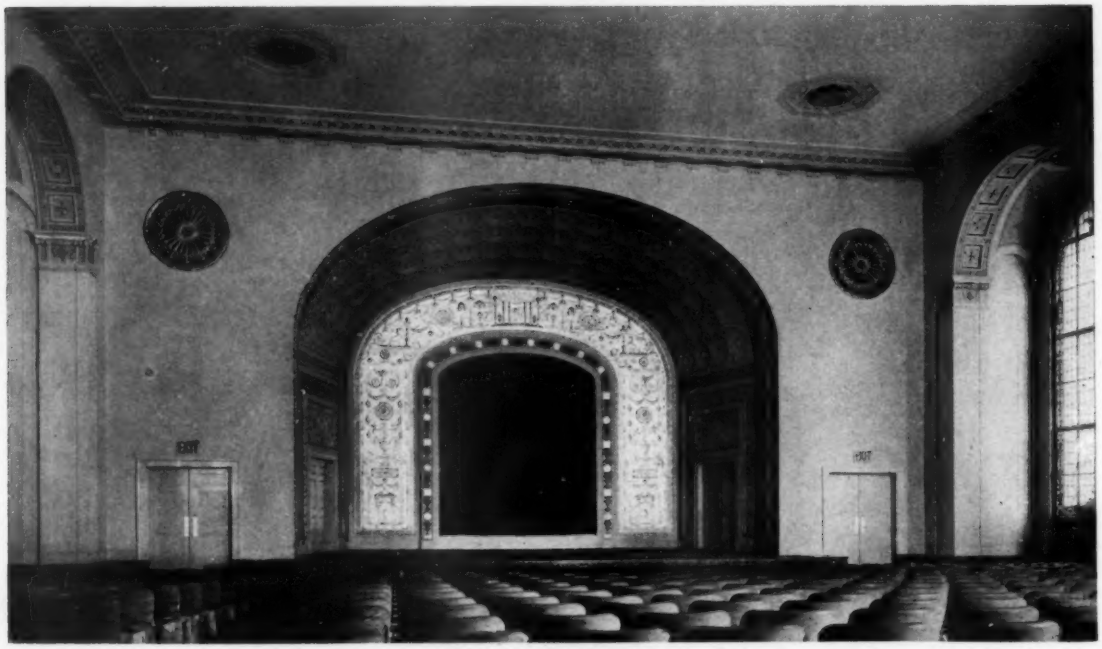


DETAIL OF BRIDGE

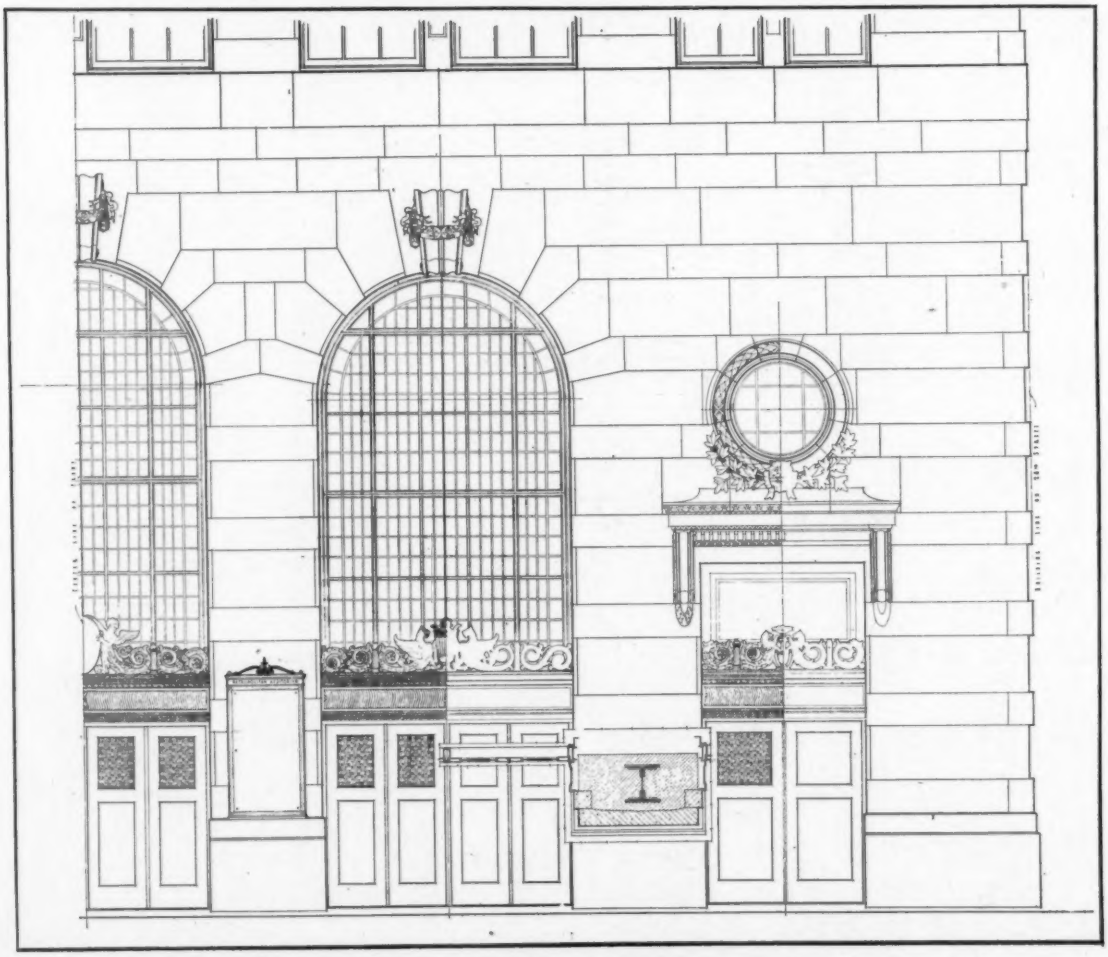
ANNEX TO METROPOLITAN LIFE INSURANCE CO. BUILDING, NEW YORK CITY

D. EVERETT WAID, ARCHITECT


COPPER
CRIMPED
BOTTOM OF ANGLE
GRILLES TO BE MADE SO AS TO BE TAKEN APART ON THIS LINE
THESE BAYS EQUALLY SPACED FOR LENGTH OF CORRIDOR
SAME CAMBER AS SILL LINE
THESE FIGURES TAKEN AT CENTRE OF WINDOW
IRON GRILLE
TOP OF PLATE GIRDER
COPPER, CRIMPED
FLOOR FINISH
BUILDING LINE
PARTIAL ELEVATION



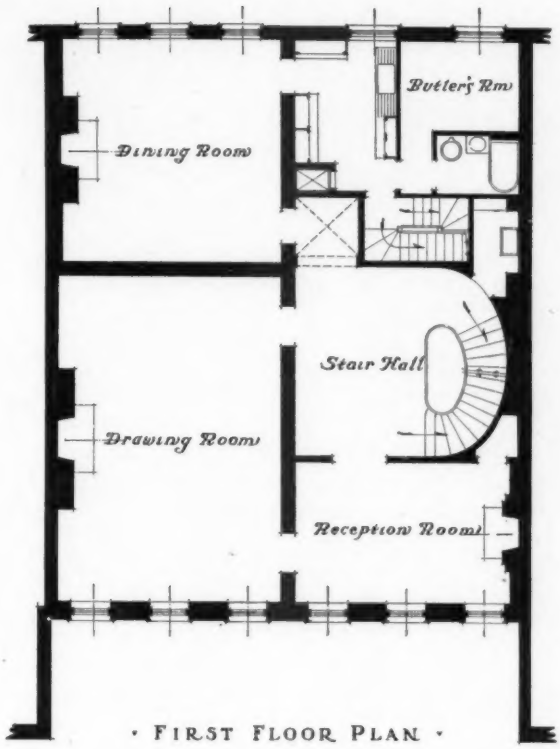
VIEW IN AUDITORIUM



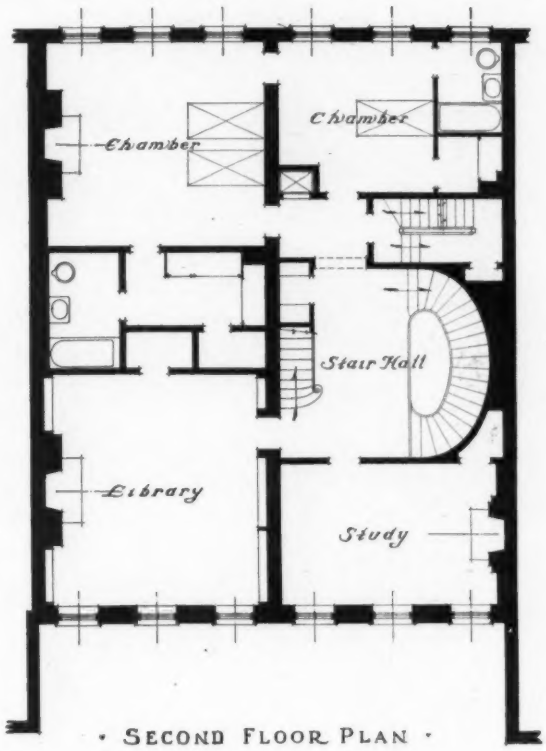
ONE-HALF ELEVATION OF MADISON AVENUE FRONT

ANNEX TO METROPOLITAN LIFE INSURANCE CO. BUILDING, NEW YORK CITY

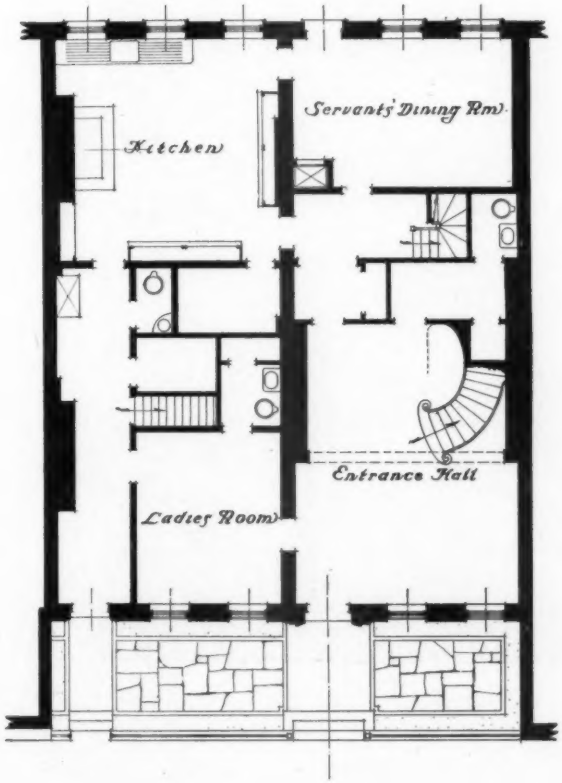
D. EVERETT WAID, ARCHITECT



· FIRST FLOOR PLAN ·



· SECOND FLOOR PLAN ·

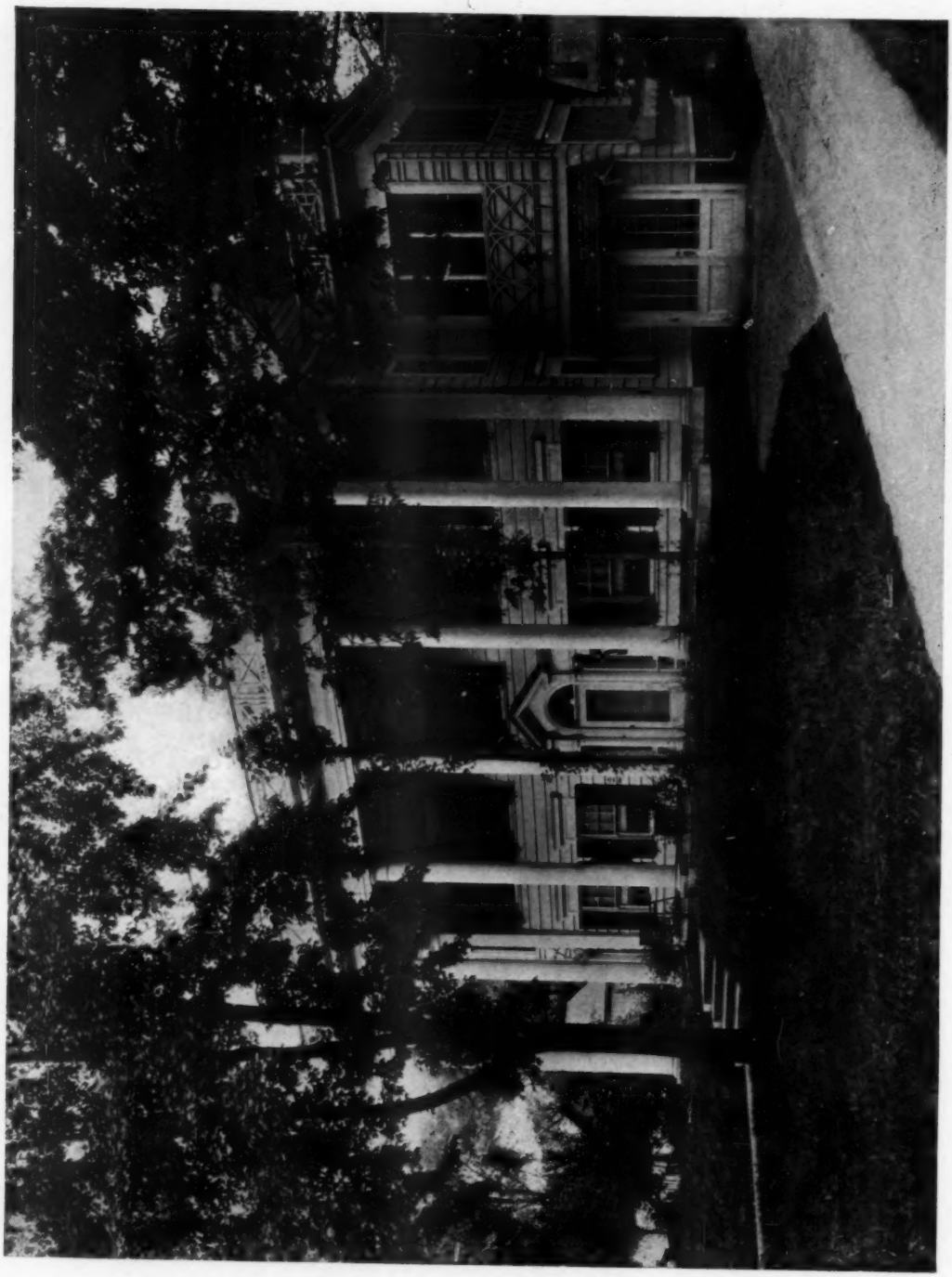


HOUSE OF A. A. FOWLER, ESQ.
EAST 71ST STREET,
NEW YORK

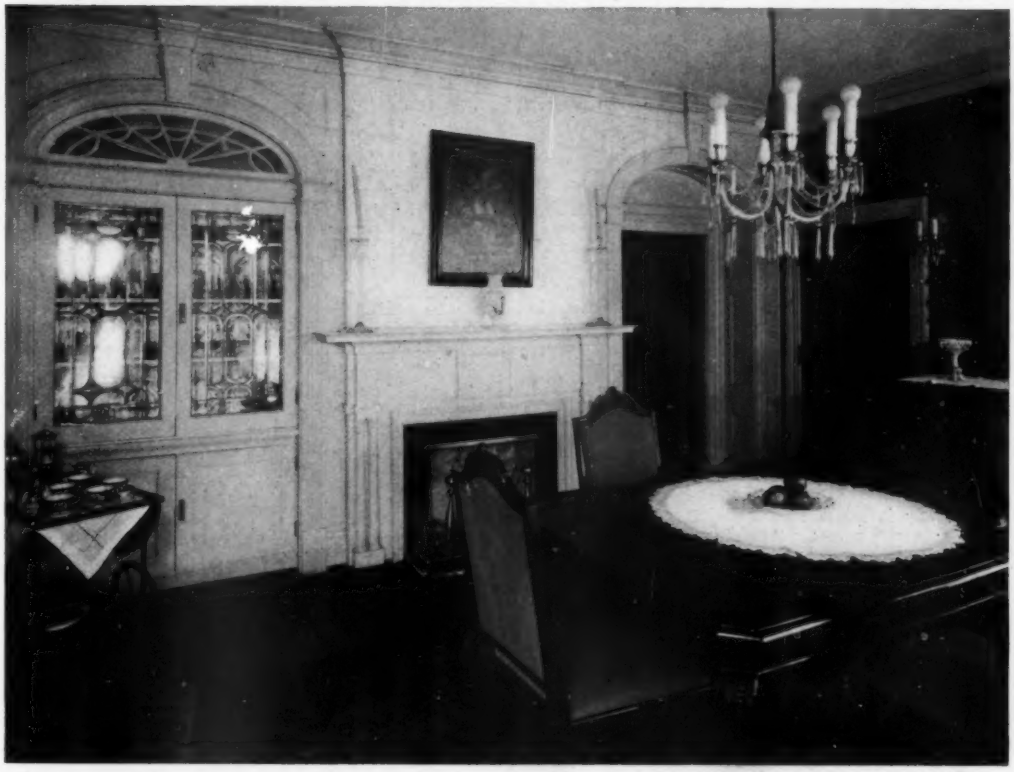
MOTT B. SCHMIDT
ARCHITECT

(See Plate Section for other views)

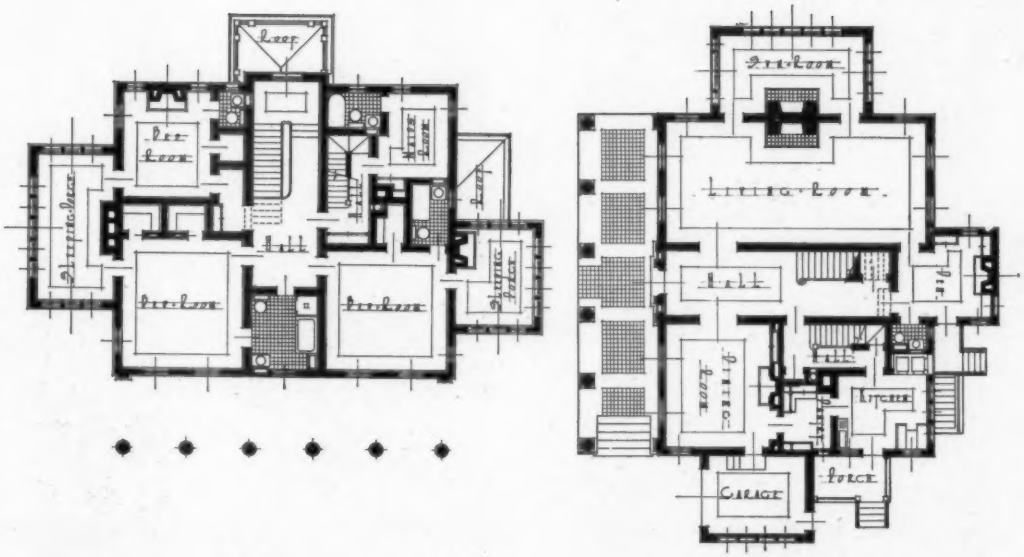
XUM



HOUSE OF S. M. COWGILL, ESQ., TERRE HAUTE, IND.
JOHNSON, MILLER & MILLER, ARCHITECTS



DINING ROOM



HOUSE OF S. M. COWGILL, ESQ., TERRE HAUTE, IND.

JOHNSON, MILLER & MILLER, ARCHITECTS

SOCIETY OF BEAUX-ARTS ARCHITECTS

DIRECTOR OF THE INSTITUTE, LLOYD WARREN

ARCHITECTURE, RAYMOND M. HOOD SCULPTURE, JOHN GREGORY

INTERIOR DECORATION, ERNEST F. TYLER MURAL PAINTING, ERNEST C. PEIXOTTO

OFFICIAL NOTIFICATION OF AWARDS — JUDGMENT OF MARCH 14TH, 1922 — FIRST PRELIMINARY COMPETITION FOR THE 15TH PARIS PRIZE.

PROGRAM

The Annual Committee on the Paris Prize proposes as subject of this Competition:

"A PRIVATE LIBRARY"

A wealthy man is to build a private library properly to house his large collection of valuable books and manuscripts. As he intends a restricted public to have access to the collection he has bought a plot at the rear of his city residence with a 50 foot frontage on another street from which the public will enter. The plot, all of which will be utilized for the building, is 100 feet deep.

There already is a court in the rear of his residence. Through this court a low, covered passage will give him access to the building. The court will also light the rear windows. This passage and court are not in the program.

We have therefore a site 50′ x 100′ for the building, which should be designed in a residential rather than a public character. One great room houses his collection. In addition to the court entrance is the public one from the street, opening into a small vestibule which gives access to a coat room and librarian's office. The great room, of sufficient height to be impressive, is to be lighted by windows on the court and on the street. On a side wall there should be an important fireplace.

Jury of Award:—J. G. Rogers, C. H. Aldrich, R. M. Hood and H. O. Milliken, Chairman.

Number of Drawings Submitted:—118.

AWARDS:—

PLACED FIRST—Third Medal:—A. E. Egeressy, "T" Square Club, Philadelphia.

PLACED SECOND—Third Medal:—E. L. Babitsky, John Huntington Poly. Inst., Cleveland.

PLACED THIRD—Third Medal:—E. W. Burkhardt, Columbia Univ., New York.

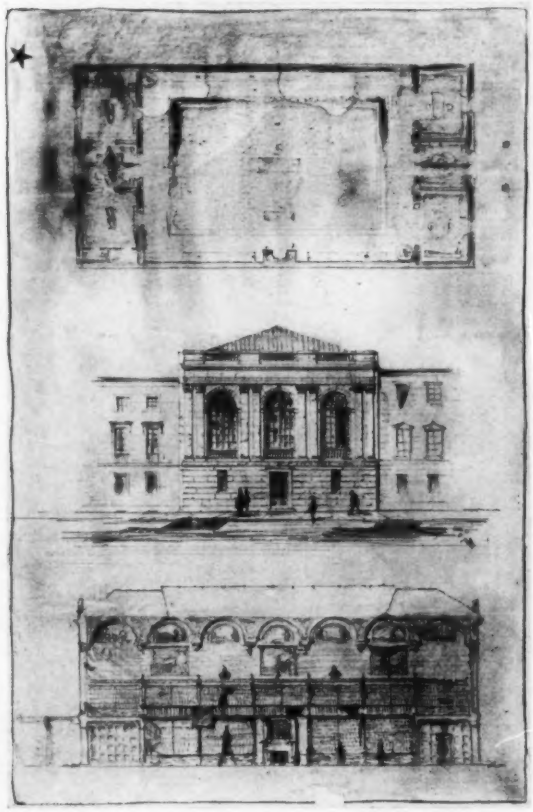
PLACED FOURTH—Third Medal:—R. Bailey, care of J. R. Pope, Arch., New York.

PLACED FIFTH—First Mention:—H. S. Bent, Univ. of Penna., Philadelphia.

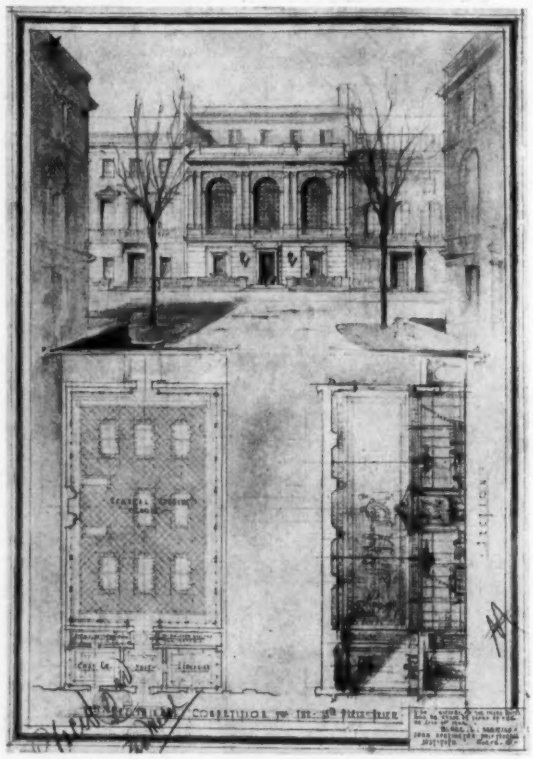
PLACED SIXTH—(First Alternate)—First Mention:—A. G. Clay, Yale Univ., New Haven.

PLACED SEVENTH—(2nd Alternate)—Third Medal:—R. H. Bowden, Columbia Univ., New York.

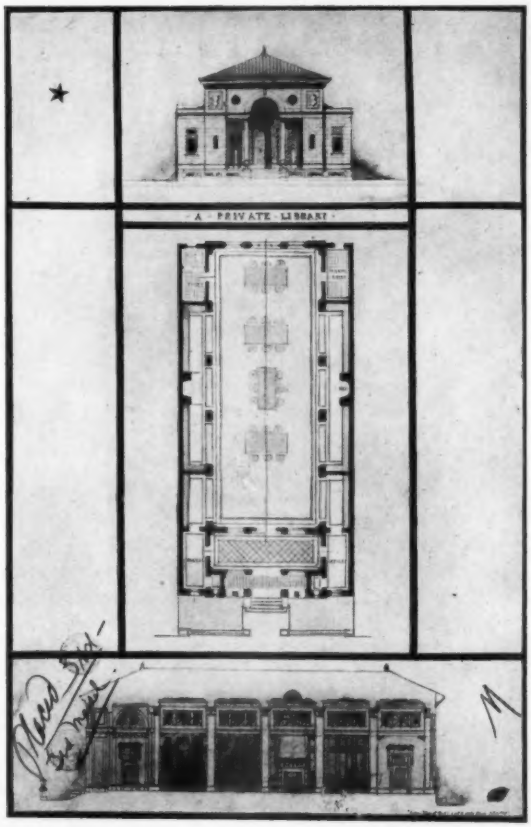
MENTION:—A. L. Muller, Columbia Univ., New York; O. M. Olsen and W. M. Burke, Carnegie Inst. of Tech., Pittsburgh; E. M. Loye, Harvard Univ., Cambridge; J. F. Gunther, Mass. Inst. of Tech., Boston; G. Hacker, Atelier Sibley, Palisade; W. K. Macomber, Univ. of Minnesota, Minneapolis; H. S. Kelly, Yale Univ., New Haven.



A. E. Egeressy "T" Square Club, Philadelphia
Placed 1st—Third Medal

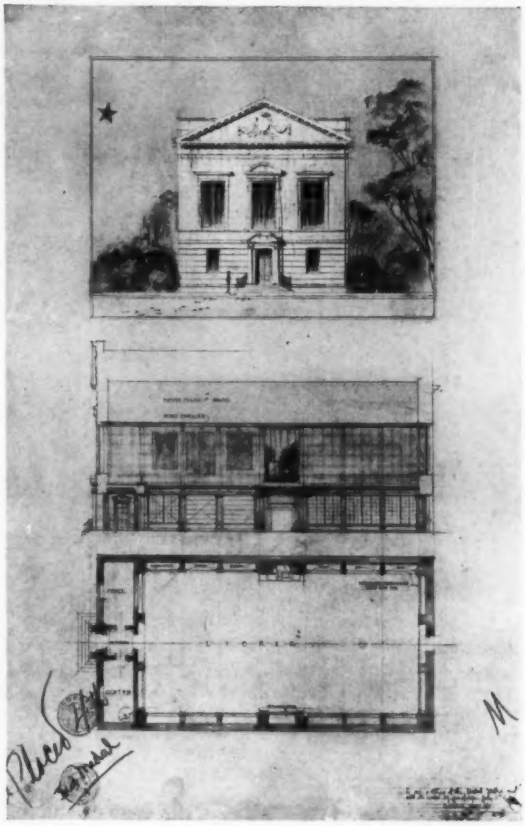


E. L. Babitsky John Huntington Polytechnic Institute
Placed 2nd—Third Medal



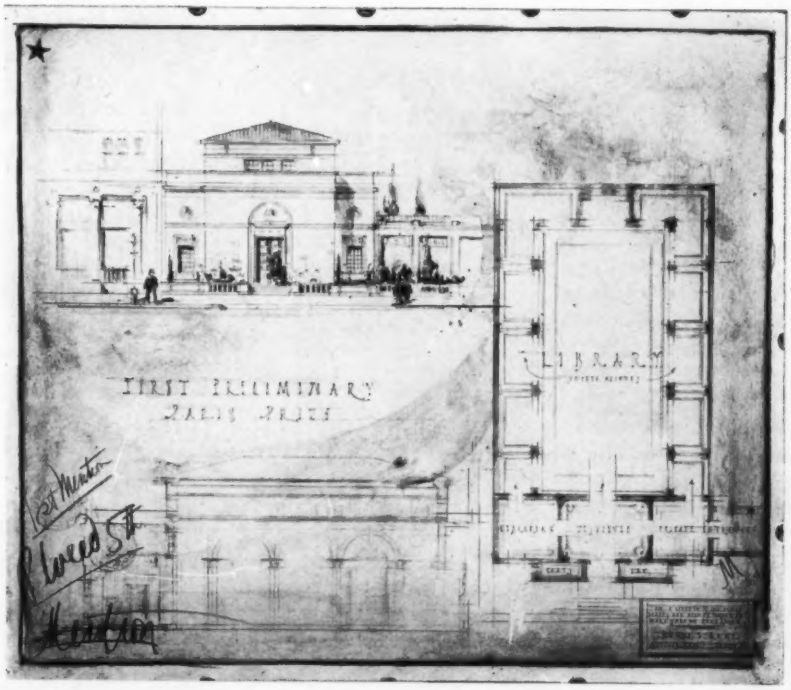
E. W. Burkhardt — Columbia University

Placed 3rd—Third Medal



R. Bailey — care of John Russell Pope

Placed 4th—Third Medal



H. S. Bent — University of Pennsylvania

Placed 5th—First Mention

FIRST PRELIMINARY
PARIS PRIZE

STUDENT WORK
SOCIETY OF BEAUX-
ARTS ARCHITECTS

XUM

LEGAL DEPARTMENT

Conducted by

CLINTON H. BLAKE, Jr., of the New York Bar

A FEW weeks ago I had the pleasure of lecturing to the students of the School of Architecture of the Massachusetts Institute of Technology. The member of the faculty who introduced me said that he had recently talked with an architect, and had asked the latter whether he had read my book on the Law of Architecture and Building. The architect replied, according to the story, "My Lord, No. If I read that I wouldn't dare practice at all!"

I quite understand the feeling which prompted this rejoinder. It is not at all an unnatural one. My main purpose, in my writings and talks to architects, having been to bring home to them the things in general which they should not do, it is not to be wondered at that this architect should have the mental reaction which he did. The summarization of legal cautions to architects naturally results in a series of "Dont's" and when one reads them one naturally receives the impression that they are more contagious than perhaps they really are.

The "Dont's" which an architect must consider and observe are, many of them, vitally and fundamentally important, but nevertheless, if properly considered, they fall into comparatively few and simple classifications. In the main, it will be found that they group themselves under the general headings dealing with the compensation of the architect, his proceedings as the agent of the owner, and his duties as the superintendent of construction.

Conversely, there are many things which an architect must remember "to" do and these affirmative injunctions can similarly be included under a few main headings.

No architect should try to store his mind with the exact knowledge of everything which he cannot do, and of everything which he must do—unless indeed he have a mind which is very far from average. What the ordinary architect can do, however, and can do very readily, is to fix the main danger areas in his mind sufficiently to warn him when he approaches them, and enable him to keep to the more tested and travelled thoroughfares. This he can do quite easily and without acquiring the pessimistic frame of mind of my Massachusetts friend.

It is not necessary that he know, to protect himself, exactly what he should do in a given case. It is not necessary that he know the precise wording which he should adopt in a letter or contract. It is not necessary that he know to just what limits he can go in approving extras or authorizing changes in the plans or in the specifications. It is sufficient if he knows that in any one of these respects, he is on dangerous ground. He can then get a proper contract prepared or at least use the Institute form, or seek competent advice as to his rights and be guided in his conduct accordingly.

Some people have a genius for doing things first and seeking advice afterwards—some on the contrary are inclined to seek advice on every point, important and unimportant alike. Between these two extremes lies the common sense rational road to be followed by the ordinary architect of today. When he is on familiar ground over which he has travelled before, let him go on at full speed. When he is on new and untested ground, notwithstanding that the prospect be fair, let him go more slowly and test, by proper advice if need be, the path that lies ahead.

With a few main rules in mind, experience will do the rest. The architect will find that, without great difficulty, he will shortly be able to sense the points in which danger is involved in ample time to avoid them altogether or, at least, to receive advice and be in a position to handle them, on a basis which will not expose him to liabilities or to commitments which he does not intend to assume.

An architect cannot be his own lawyer, any more than a lawyer can be his own architect. What he can do, however, is to acquire a sufficiently clear idea of the basis on which his rights and liabilities rest to know when he needs legal advice, and when he does not need it.

If he arrive at this point he will have travelled at least three-quarters of the way along the road leading to comparative safety from unnecessary loss and entanglements.

LEGAL DECISIONS

THE instructions to bidders included a statement to the effect that the owner had contracted for all of the structural steel to be erected within eight weeks' time after the foundations were prepared and ready to receive it. The contract for the steel construction itself provided that the steel erection should begin within nine weeks

after the complete plans were ready and delivered and the foundations ready to receive the steel and that the work should be carried on and entirely completed within eight weeks. The instructions to the bidders also provided that in the event of any delay in erecting the steel there should be a corresponding extension of the time allowed to the general contractor but that he would not be given any claim for damages thereby.

The work of erecting the steel commenced within a few days after the time that the foundations were ready.

The surety on the bond of the contractor urged on the foregoing facts, that there had been a false statement in the instructions to bidders and that the surety was thereby relieved from liability. The Court held that this position was untenable and that there was no false statement which would relieve the surety of its obligations. It further appeared in the proof that a bond had been given to secure the performance of the contract and that the bond provided that no liability should attach to the surety by reason of any default on the part of the contractor unless the one in whose favor the bond was given should, within thirty days' time after he received knowledge of the default of the contractor, give proper notification of his claim to the surety. This notice was not given until long after the time for the completion of the work had expired, but was given promptly following the first notice and certificate which the owner received from the architect to the effect that the contractor was improperly delaying the work.

It was held that the question of default on the part of the contractor was one which the architect was called upon in some measure, at least, to determine and that inasmuch as the notice was given promptly following the certification by the architect of the contractor's delay and consequent default, and the thirty days from the giving of this certificate had not expired when the surety was notified of the default, the notice to the surety was given in due time and the surety was not released.

The contract further provided that extra work should be fixed by agreement of the parties and that certain additional floors in the structure should be finished at the election of the owner on or before a specified date. When this date was reached, the steel construction by another contractor had not yet been completed. A long time thereafter, an agreement was made for the completion of these floors at the price originally fixed in the contract, plus, however, 5% additional, and with the proviso that this work was to be done before the contract was completed. The Court held that this was not such an alteration of the contract as would operate as a release of the obligations of the surety and that the surety could not successfully claim that it was such.

The contract further provided that the owner, on the default of the contractor, might complete the work and that in the event that he did complete the work under this provision of the contract, the expense incident to his doing so, should be audited and certified by the architect and that the certificate of the architect rendered after he had completed this audit should be conclusive.

The bond of the contractor provided that the surety should not be liable in any action instituted later than a specified date and it appeared that the building had not on that date been completed and that, therefore, a certificate covering all items could not be given. No objection was raised on the trial to the fact that this certificate was not produced, but the question was raised for the first time on the appeal. The Appellate Court held that the failure to produce the certificate did not abate the action and did not bar a recovery against the surety on the bond.

The action in this case was brought against the contractor, against the surety for the contractor and against all parties having or claiming liens, and it was asked that the rights of all parties be determined. The Surety Company made a motion to require the plaintiff to elect whether he would proceed solely against the Surety Company or would proceed solely against the other defendants and asked that in the event that he refused so to elect, the cause of action against the other defendants be stricken out. This motion was overruled by the Trial Court and the other defendants did not complain of this action by the Court. The Appellate Court held that, under the circumstances, the motion had been properly overruled.

It was further provided under the contract that the contractor should purchase all of the materials and should employ all of the labor necessary to the job but that he should not purchase any materials except in small quantities, not exceeding $350.00, without submitting prices and quantities to the owner and securing the approval of the latter. The contract required the owner also to advance from time to time to the contractor the monies necessary to meet the payrolls and required the owner to pay all bills for material.

It further provided that under certain circumstances the owner might determine the rate of wages to be paid. The Court held that, under these conditions, the contractor was, in effect, the agent of the owner in the purchase of materials and that the owner was liable for the purchase price of materials purchased by the contractor and used in the construction of the building, and that this liability was not affected by the fact that liens for the materials so furnished had not been filed in time.

Cowles v. Mardis Co. (*Supreme Court of Iowa*, 181 *N. W.* 872).

XUM

DEPARTMENT OF SPECIFICATIONS

CONCRETE SPECIFICATIONS (*Continued*)

IN the previous article in this department the waterproofing of building foundations was the last subject discussed, and that discussion was somewhat general. The following notes in particular should be of value to the specification writer.

In "Modern Methods of Waterproofing" by Myron H. Lewis, C. E. there appears the following discussion:

NECESSITY FOR WATERPROOFING—In many of the forms of construction work to which concrete is so admirably adapted, its use brings with it one inherent fault—a fault for which remedies have long been sought but which until recent years have not been found in a practical form to suit all the varied needs of modern construction. This striking fault of concrete work is its great thirst for water, a fault which varies in its gravity according to the proportioning and the mixing of materials and to the nature of the structure, it frequently being the cause of extremely serious difficulties. Of all the opposing forces which constructors have had to combat from time immemorial, none has exceeded in its power for evil the unwelcome intrusion of water, and building materials which in their nature favor such intrusion must suffer in value to the extent of their permeability or absorptive power.

The fact that in practice concrete is frequently found to be porous and permeable has been one of the leading checks in its rapid development. Volumes have been written on how the ingredients might be mixed to produce a water-tight concrete but we might as well seek to solve the problem of perpetual motion as to try to mix cement, sand and stone so as not to absorb water.

If we could examine a section of concrete under a powerful microscope, it would appear to us like an immense sieve through which fine particles of water flow with more or less freedom.

We have seen water rise up through concrete walls for many feet, and it will rise until the weight of the water absorbed is equal to the capillary attracting force.

If concrete is mixed rich and mixed wet, a high degree of impermeability can be secured. Mixing rich imposes greater barriers to the passage of water; mixing wet minimizes the formation of blow holes by displacing much of the extrained air, but neither mixing rich nor mixing wet destroys the "capillary positive" property of the concrete mass. Its absorptive capacity has been largely decreased, but its attraction for moisture has, however, not been eliminated; thus the water-tightness procured by rich and wet mixtures, however theoretically correct the proportions might be, is one of degree only, a degree sometimes approaching the ideal but never reaching it. We cannot expect that a mixture made of cement and stone, each of which is in itself "capillary positive," or water-attracting, can become absolutely proof against the absorption of water by the mere act of mixing, unless indeed, the operation had produced some phenomenal change in the very nature of the constituent materials. By care and diligence a mixture may be produced which is sufficiently close-grained to prevent the free transmission of water, prevent it sufficiently, in fact, to be all that is required in many forms of construction work. But where water absorption, besides water penetration, is to be absolutely prevented, no degree of mixing, no richness of mixture, will altogether answer the purpose; and yet in many of the forms in which concrete enters our modern buildings, it is resistance to water absorption that is required. Not merely water-tightness in the ordinary sense of the word, but resistance to the ceaseless endeavors of atmospheric moisture to find its way by capillarity through porous bodies. Some counteracting influence to this tendency of ordinary concrete to take up water by capillarity is, therefore, what is required when dampness is to be eliminated.

It is true that concrete exposed to the free passage of water becomes after a time so clogged up by fine silt present in the water that the permeability is greatly reduced; and Hagloch states that concrete-block buildings exposed to the weather become water-tight in from three to twelve years, a fact which we must likewise ascribe to the clogging of the surface of the blocks by atmospheric dust deposited by rain, and which remains after evaporation.

Modern engineering or architectural practice should certainly not sanction a practice of waiting for the erratic and uncertain hand of time where it is essential to secure water-tightness and dampproofness in concrete structures, and in the meantime to incur the annoying consequences that always accompany damp and leaky structures; and yet this is precisely what is being done in numberless instances by those who refuse to realize the importance of water-tightness in concrete work, or while realizing it, are willing through motives of false economy, to gamble with the future—nearly always at their loss.

The number of mistakes made by inadequate provision for waterproofing, and their costly consequences, running into thousands of dollars, should serve as object lessons to those who have the design of concrete work in hand and the same degree of attention and study should be given the subject of water-tightness as that given to other details of construction.

IMPORTANCE OF ADEQUATE INSPECTION—Thorough inspection is particularly essential in the bituminous shield or membrane method, where the waterproofing is to be covered or backed up by protecting masonry or by other material and thus cannot be readily reached for repairs. In dampproofing exposed walls of buildings by application of an asphaltic coating on the interior surface of the walls, inspection should also be particularly rigid as failure means the removal of the plaster covering. Furthermore, the difficulty in tracing the sources of leakage when the waterproofing is covered up makes the repair work uncertain and costly.

On large works particularly, materials specified for waterproofing purposes should be subject to the same degree of inspection and tests as other construction materials. There is nothing easier than the substitution of poor materials for good ones by irresponsible contractors or dealers, particularly when the price is much below the standard price for light materials. So many of the coal tar and asphaltic preparations look alike that the quality of the material delivered can be ascertained only by subjecting them to specified tests fixed according to the character of the work in hand. Waterproofing felts and other fabrics should also be examined for defects, and powders and other materials to be introduced as a part of concrete work should be tested and compared with samples obtained, to see that the material ordered is actually delivered.

So many instances of failures due to various causes have occurred that it might be well, before proceeding to the detailed consideration of various systems of waterproofing, to review briefly the important points to be considered in general to obtain permanency and efficiency.

The following general principles, if carefully followed, will result in economical, durable, and efficient work:

General Principles to be Followed in All Waterproofing

1. In deciding upon a system of waterproofing for any particular structure, study the individual conditions of the problem in hand. Consider the location, climate, service, nature of soil, foundation, and all other pertinent data and adopt a plan best suited for the necessities of the case.

2. The portions of the structure to be treated must be so designed and prepared that the waterproofing may be properly applied thereon, allowing sufficient working room for securing good surfaces and providing for adequate drainage where water pressure is to be taken care of during construction.

3. Complete, unbroken continuity of the waterproofing stratum must be obtained, being allowed for in the design and insisted upon in the construction. Any breaks in the continuity of the work will surely be disclosed in time by leaks.

4. The material as well as the design, should be suited to the individual conditions of the work, and the delivery of the material ordered should be proved by tests and comparison with samples previously submitted.

5. Where the designer or owner is not familiar with this class of work, alternative plans and estimates may be called for from several responsible concerns and submitted to an impartial architect or engineer qualified to pass judgment on same.

6. Where work is to be done by the immediate purchaser of materials, complete and explicit instructions should be obtained from the dealer upon written request and in conformity with the conditions outlined by the purchaser and these instructions should be rigidly followed.

7. The labor employed in all waterproofing should be intelligent and careful and wherever possible, experienced. The most satisfactory way is to have materials applied by a representative of the manufacturer under a guarantee and under supervision of a competent inspector.

8. In all large jobs a competent inspector should be present from the inception of the work to its completion, and nothing should be done, and no tampering or interference allowed without his knowledge.

The Membrane Method of Waterproofing

The term "membrane method" refers to an elastic, continuous, bituminous, impervious sheet or membrane which completely surrounds the structure to be waterproofed. This method is adapted principally to waterproofing structures in course of erection, particularly those portions below ground, such as subways, tunnels, building foundations, retaining walls, etc. It is not so well adapted to waterproofing structures already erected or to remedy leaky conditions in same, or to dampproofing exposed walls of structures. Other methods must be adopted for these conditions and these will be considered later.

MATERIALS—The materials employed in the membrane method of waterproofing are: coal tar pitch, applied hot; commercial asphalts, applied hot; specially prepared asphalts and compounds sold under various trade names, applied cold; and asphalt mastic, applied hot. When merely dampness is to be excluded, any of the first three named materials may be employed, two or more coats being put on to insure thoroughly covering the surfaces. When water is to be excluded these three materials are employed as binders in conjunction with either of the following fabrics: tarred felt; asphalted felt; burlap (ordinary); burlap (saturated with asphalt); combinations of felt and burlap.

The number of plies to be used depends upon the local conditions and the head of water to be resisted. The specification writer should be care-

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ful to observe that the number of ply thicknesses required by conditions is specified.

QUALITY OF MATERIAL—Both the cementing materials and the fabrics, in order to be serviceable for waterproofing operations, must be elastic and durable and retain these properties through the range of temperature to which they may possibly be subjected after being placed in the work.

In order that materials of a desired quality be obtained, certain requirements are usually outlined in the specifications, and it is incumbent on the inspector to see that these requirements are fulfilled as far as it is within his power to do so. Laboratory tests should be made on the material delivered on the work to determine whether the physical and chemical requirements are satisfied.

APPLICATION OF MATERIALS IN THE MEMBRANE METHOD—In the application of the materials, certain fundamental requirements must be fulfilled upon which the final success of the work will largely depend, and it is the duty of the inspector to see that such requirements are fulfilled. These requirements may be conveniently classed under headings, as follows: Preparation of surface; continuity of work; protection of waterproofing.

PREPARATION OF SURFACE—It is difficult to make a bituminous sheet adhere to a surface that is either too rough, too wet, covered with dirt or foreign matter, or possessing too fine a glaze due to richness of cement surface. It is therefore necessary to see that: all dirt and foreign matter are removed before waterproofing is applied; that an adequate drainage system is installed and maintained, and that the wall is dry when the waterproofing is applied; in case complete dryness cannot be secured, that a layer of felt in addition to those called for in the specifications is first laid against the surface; the surface should be smoothed off with a trowel if too rough; in case wall is of concrete, that the concrete be thoroughly set; in case wall is covered with a fine skin of cement, that it is roughened up to insure sticking of material; sharp projections on the masonry should be removed or they will puncture the waterproofing; metal surfaces should be dry and clean, free from rust, loose scale and dirt. If previously coated with oil, same should be removed with benzine or other suitable means. Warming may be accomplished by heated sand, which is removed as material is applied.

CONTINUITY OF WORK—Lack of continuity will be fatal to any waterproofing work, as water is sure to find its way through any breaks, however small.

PROTECTION—After the waterproofing has been put in place, it must be properly protected against injury from any cause whatever. Injury may be avoided by placing against the waterproofing a protecting layer of cement mortar mixed in the proportions of one part cement to two and one-half parts sand, placed as soon as possible after the laying of the waterproofing, not exceeding twelve to twenty-four hours. When brick work is placed against waterproofing on vertical walls, a slight space may be left for slushing in with mortar to avoid puncturing. The brick should not be rammed up against the waterproofing sheet.

THE INTEGRAL METHOD OF WATERPROOFING

The term "integral" refers to those methods wherein the waterproofing material becomes an integral part of the structure treated. It includes:

1. The various methods employed in making concrete and masonry impermeable *per se*:
   By properly grading materials
   (a) The addition of special materials to the water used in tempering the cement, or
   (b) The addition of special materials, dry to the cement, or
   (c) The use of a cement waterproofed in the process of manufacture.
2. The application of materials thus prepared as a plaster or coating to the surfaces to be treated, such coating becoming an integral part of the structure.

The integral method is distinguished from purely surface applications in that the latter are applied as a paint, and while some of the materials penetrate to a considerable extent, periodical renewal is required when exposed to the elements, although with some of the materials, renewals may not be required for many years.

ADAPTABILITY OF THE INTEGRAL METHOD—The integral method of waterproofing, as above outlined, is adapted to treatment of numerous conditions. In the form of the coating, it is particularly adapted to remedying leaky conditions in sub-structures already erected, where excavations would be too costly and inconvenient.

Although the logical place to apply waterproof cement coatings is on surfaces exposed to the water, yet owing to the inaccessibility of the outer surfaces for examination and repairs, the coatings are applied to the inner surfaces. It will withstand any ordinary water pressure in this position if the work is properly executed.

In many cases, either the membrane or integral methods may be employed with equally good results and a selection of type must be made by the designer, after comparing their cost.

ADDITION OF WATERPROOFING MATERIAL TO THE CONCRETE—Concrete, even when mixed according to the most rigid rules and under the most competent supervision, often falls short of its purpose in resisting water penetrations. This condition, and the inherent attraction of concrete for water, has resulted in the

(*Concluded on page 498*)

DEPARTMENT OF ARCHITECTURAL ENGINEERING

ARCHITECTURAL ACOUSTICS—II

The Nature and Reduction of Office Noises

BY PAUL E. SABINE*

FROM the results of the investigations made in the Sound Chamber, the total absorbing power of the room and its contents may be easily computed as well as the total sound energy produced, measured in terms of the minimum intensity which can be heard. Referring to equation (5) and letting t_1 and t_2 be the times of reverberation when the initial energies are E_1 and E_2 respectively, we have

$$at_1 = \frac{4V}{v} \log_e \frac{E_1}{V}$$

$$at_2 = \frac{4V}{v} \log_e \frac{E_2}{V}$$

subtracting

$$a = \frac{4V}{v} \frac{\left[\log_e \frac{E_1}{V} - \log_e \frac{E_2}{V}\right]}{t_1 - t_2}$$

or

$$a = \frac{4V}{v} \frac{\log_e \left(\frac{E_1}{E_2}\right)}{t_1 - t_2} = 2.30 \frac{4V}{v} \left[\frac{\left(\log_{10} \frac{E_1}{E_2}\right)}{t_1 - t_2}\right]$$

As has just been shown, the ratio of the sound energies is equal to the ratio of the energies of the impacts, so that the expression in the last equation within the parenthesis is the slope of the straight line in Fig. 2. For the room in the standard condition, this slope is .793. The volume of the Sound Chamber is 289 cubic meters, and the velocity of sound at the temperature at which the experiment was performed is 341 meters per second. Hence the absorbing power of the room

$$a = \frac{2.30 \times 289 \times .793 \times 4}{341} = 6.18$$

With the felt in the room, by a similar computation

$$a' = 9.42$$

*Riverbank Laboratories, Geneva, Ill.

Equation (6) furnishes an independent means of determining a'. Using this relation, and the value of a given above, the average value of a' computed from the times for the five different intensities of the impact, is 9.52, an agreement which is quite good in view of the fact that a difference of .04 secs. in the timing will produce the difference in the two values of a'.

The reader familiar with the work of Professor Sabine will recognize the correspondence between this experiment and his "Four Organ Pipe" experiment for the determination of the absolute rate of decay of sustained pure tones within a closed room. The extension of the method to short impulsive sounds without musical characteristics is of scientific interest since it affords a means of quantitative study of such *noises*, a problem which has not hitherto been undertaken by physicists.

Having established the validity of our fundamental equation for impulsive sound from one source, it becomes of interest to extend the investigation to sounds of this character from other sources. Since the absorption co-efficients of a single material may vary widely with the pitch, it may well be supposed that a given material would exhibit markedly different absorptive properties for different impulsive sounds. There is a pronounced difference to the ear in the qualities of the sounds produced by the upstroke and the downstroke of a telegraph sounder. The click of one make of typewriter is easily distinguished from that of other machines, due to differences in the size and shape of the type bars, as well as to the different mechanisms of the stroke. It would therefore be unwise to draw general conclusions as to the absorptive properties of a material for all other noises from experiments conducted with a single noise. For scientific completeness, the investigation just described, using the release stroke of the telegraph sounder, should be repeated with other sources. Since, however, the object of the present study is

to determine the *relative* merits of different forms of office quieting treatment, the purpose will be served if we can express the absorbing powers of different materials for various office sounds in terms of some standard material. Here again, one has to thank Professor Sabine for pointing the way in his early experiments, in which he expressed the absorbing powers of rooms and materials in terms of a chosen unit, which in that instance was the absorption of a highly absorbent seat cushion. It will first be necessary, however, to deal with a fact that was brought out by the present investigation, and which is of considerable importance in the general matter of reducing excessive reverberations by the use of highly absorbent materials.

Effect of Area Upon Absorbing Efficiency

Experiments, carefully conducted, have shown that the apparent absorbing power per unit area of a highly absorbent material depends in a marked degree upon the area of the sample tested. It depends also, although to a less degree upon the shape.

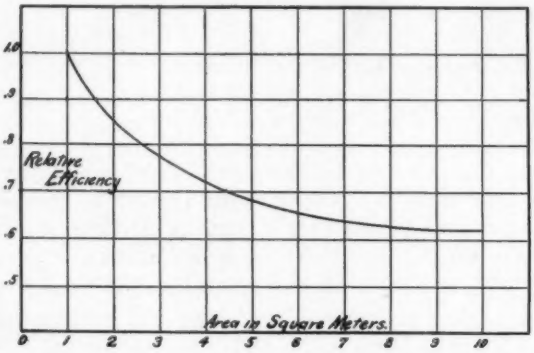


Fig. 6. Absorptive power per square meter for impulsive sounds of different areas of uncovered one inch hair felt; the absorption of one square meter being taken as Unity

Let a', a'', a''', be the total absorbing power of the room and its contents when areas s', s'', s''', respectively of absorbent material are introduced. For impulsive sounds, equation (6) may be written

$$at_1 = a' t'_1 = a'' t''_1 = a''' t'''_1 = k \qquad (7)$$

Assume that the absorbing power per square meter of the material is constant and independent of the area, and that it is equal to a_f. Then the absorbing power of any area, s, will be $a_f \times s$, and equation (7) may be written in the general form

$$(a + a_f s)\ t = k \quad \text{or}$$
$$a + a_f s = k\,(1/t) \qquad (8)$$

If now samples of different areas be brought into the room, and the times of reverberation be experimentally determined, and if the reciprocals of these times be plotted against the corresponding areas, the points so determined should lie upon a straight line, according to equation (8). As a matter of fact, it was found that this was not the case for impulsive sounds. Since the validity of equation (8) has been established in the case of the upstroke of the telegraph sounder, one is forced to the conclusion that the absorbing power per unit area varies with the area of the absorbing material. This conclusion was made the subject of some two months' careful investigation, using both sustained tones and impulsive sounds.*

The net result of this work may be summarized in the statement that the apparent absorbing power per unit area of highly absorbing materials decreases in a perfectly definite manner as the area increases up to about ten square meters.

Fig. (6) shows the relative absorbing efficiency, for the upstroke of the telegraph sounder, of different areas, of uncovered hair felt, 1 inch thick, the absorbing power of 1 square meter being taken as unity. A similar curve for high pitched sustained tones approximates this very closely. If the actual area introduced into the room be multiplied by the ordinate of the curve, Fig. (6) corresponding to this area, the product as obtained is proportional to the true absorbing power. We shall call this the Effective Absorbing Area. Returning to equation (8), we now plot the reciprocals of the time of reverberation against, not the actual area but the Effective Absorbing Area as just defined. Fig. (7) gives the result for five different impulsive sounds. Lines 1 and 2 are for the upstroke and the downstroke respectively of the telegraph sounder. Lines 3, 4 and 5 are for three different makes of typewriters in common use. The closeness of the experimental points to the straight line in every case, is a quite satisfactory verification of equation (8), and justifies the assumption that the change of absorbing efficiency with changing area is the same for all five sounds.

From the straight lines of Fig. (7), the absorbing power of the room in terms of the unit square meter of felt may be derived. The slope of the line in each case is the increase in $1/t$ per unit of added absorbing material. If the value of $1/t$ obtained with the empty room be divided by this slope, the quotient is the number of unit squares of felt that have an absorbing power equal to the floor, walls, ceiling, and permanent furnishings of the Sound Chamber. The values for the three typewriters include also the absorbing power of

** A report on the results of the experiments with sustained tones was given in a paper read before the American Physical Society in Toronto in December, 1921. An abstract of this paper will appear in a forthcoming issue of the Physical Review.*

the operator. In the following table, the value of the slopes of the lines is given in the column

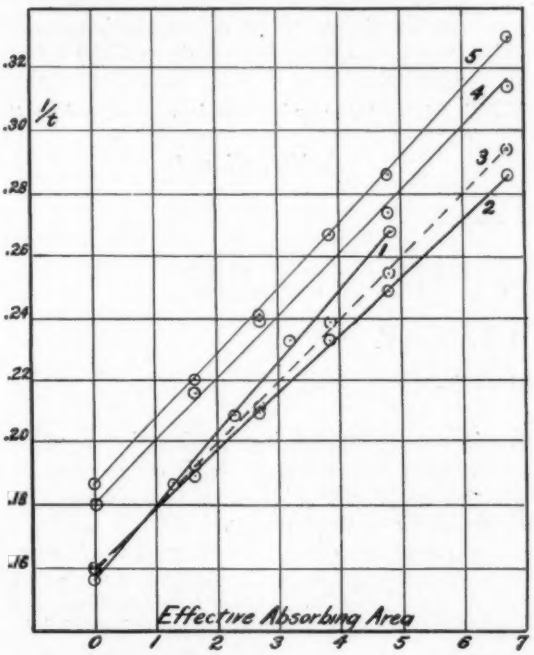


Fig. 7. Graphs showing that the change in the reciprocal of the time of reverberation is proportional to the change of the total absorbing power of the room for five different impulsive sounds

headed $\frac{\Delta\,(\frac{1}{t})}{\Delta\,s}$ and the absorbing power of the room in terms of units squares of felt is given in the column a/a_f.

TABLE 1

No.	*Source*	$\frac{\Delta\,(\frac{1}{t})}{\Delta\,s}$	a/a_f
1.	Upstroke of Telegraph Sounder	.0232	6.75
2.	Downstroke of Telegraph Sounder	.0186	8.58
3.	Typewriter A	.0200	7.96
4.	Typewriter B	.0202	8.92
5.	Typewriter C	.0214	8.68

Having the absorbing power of the Sound Chamber for these various impulsive sounds in terms of the absorbing power of a single square meter of uncovered felt, the absorbing powers of the various surfaces in which we are interested may be determined in terms of the same unit, and values which will give the relative merits of such wall-surfacings in reducing office noises may thus be obtained.

PART II.

Relative Efficiencies of Different Materials

Before applying the results of the investigation of Part 1 to the determination of the relative sound absorbing efficiencies of different materials, it will be well to summarize briefly what has gone before.

The theory of Reverberation for sustained tones has been modified to cover the case of the non-musical noises caused by the impact between two metallic bodies. The theory has been experimentally verified in the case of the release stroke of a telegraph sounder, and it has been shown that the time of reverberation of the sound of such an impact varies linearly as the logarithm of the mechanical energy of the impact. The absolute rate of dissipation of such a sound in a room and, from this, the total absorbing power of the room have been determined. By introducing varying amounts of absorbing material, thus changing the total absorbing power, and measuring the absolute rate of dissipation of sound, it has been shown that the product of the total absorbing power and the time of reverberation of an impact sound of given initial intensity is constant. The investigation has also developed the important fact that the absorbing efficiency of highly absorbing materials both for sustained tones and for impact sounds is greater when the material is employed in small units of area. Finally, the absorbing power of the room in terms of the absorptive power of a square meter of a standard material (one inch hair felt) has been determined for the sounds from five different sources, from which, the absorptive efficiency of any surface introduced into the room may be experimentally determined in terms of this same unit.

Absorption of sound energy occurs at reflection from surfaces that are inelastically compressible or flexible, and from rigid surfaces that are porous. The most commonly employed method of reducing office noises consists in lining walls and ceilings with felt an inch or more in thickness. This is covered with a light fabric, held a short distance from the felt. The inelastic flexure of the fabric covering, together with the inelastic compression and the porosity of the felt beneath, constitute the mechanism by which the vibrational energy of the sound wave is dissipated. In recent years, a sound absorbent tile has been developed. This is a structural material, light and extremely porous, and its absorptive merits are due to this latter property. Very recently a plaster has been developed, which is sound absorbent to a degree far in excess of that of ordinary plaster. Accordingly tests were made to determine the rela-

tive efficiencies of these materials in absorbing the sound produced in the five different ways mentioned in Table 1.

The typewriters used were chosen because the quality of the noises produced were markedly different, as judged by the ear. They were not new machines, and the results may be taken as typical of the conditions that would ordinarily obtain in practice. Although the method is susceptible of application in determining the merits and demerits of various office machines as noise producers, yet this was not the purpose of the present investigation. The force of the telegraph sounder blows was somewhat greater than would ordinarily be the case, but the values of the absorption co-efficients were found to be independent of the energy of the stroke.

NOTE—This is the second of a series of three articles, the first of which appeared in the issue of May 24.

(To be continued)

ELECTRICITY IN THE HOUSE

VI — THE CELLAR

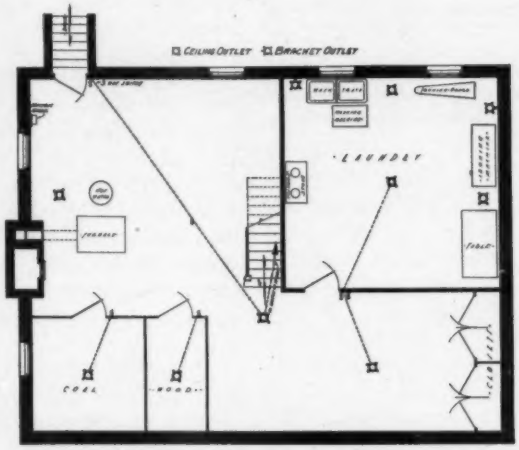
BY M. O. WHITTON

OF the many thousand readers of Sinclair Lewis' now famous "Main Street," few have not paused to chuckle over the description of Carol poring over artistic designs for their new house, while her husband declares that she can have any old kind of architecture that she wants, providing she lets him pick out the furnace.

Although we do not all live in Minnesota, and without reference to Mr. Volstead, any seasoned and experienced houseowner will appreciate the comfort of having a well planned cellar; it may be out of sight, but all the beauty of rich rugs, soft colors and fine old furniture to the contrary notwithstanding, the cellar is not out of mind.

And if there is an infinite degree of comfort to be obtained in having a well planned and well equipped cellar, one great element in that comfort lies in having it well lighted and wired.

In advocating adequate wiring for the cellar the writer is not leading the unwary into ways of extravagance, for there is no place in the entire house in which the wiring can be done so inexpensively. Since the cellar is for use and not for looks, the plainest of utility wiring may be employed which can be strung around the cellar walls and ceiling almost at convenience, and at much less cost than that of wiring above stairs. If further excuse were needed for presenting a plan of adequate cellar lighting, justification would be found in the fact that the cellar is the home of two very necessary adjuncts to comfortable living,—the furnace and the laundry.



The wiring of this cellar is representative of many modern cellars

Jokes are some of the saddest records of human history; nor would there be such an endless procession of jokes on the subject of furnace tending, were that occupation not one of those banes of human existence,—the price that we pay for being thin skinned animals, or for not living in California. Unfortunately, the writer knows of no electric device for stoking that boiler, for shaking the fire, nor yet for removing the ashes therefrom. The best that we can do at this stage of the game is to provide electric thermostatic control and sufficient light so that the furnace tender may see what he is about.

Let us turn then to our plan, which represents the cellar of an average suburban house of the better type, some thirty feet by forty, and which is to serve not only as a heating source for the house, but also as a location for the laundry, and if need be, as a drying room. Entrance into the cellar is to be had both from stairs in the center of the house, and from a small rear outside entry.

Just to the right of the entry are placed the electric supply company's boards and meters (or single meter as the case may be). This location is in no sense absolute, for the exact placement of a

meter will depend on circumstances outside of the cellar itself; however, a cellar location of some sort is usually preferred now, to enable the company representatives to read the meter at intervals without having access to the rest of the house. In this cellar, the meter is shown right near the entry, a position easily reached, a condition mutually advantageous to the meter reader and to the householder. Formerly, especially in suburban locations, it was the custom to place electric meters in the attic, a very inexpensive location where overhead electric transmission prevails, but one rather disadvantageous for all other considerations.

Turning next to the problem of cellar lighting as such. The first requirement is to have light so placed, and so made available, that the person approaching the furnace either from inside the house or from without, will not be in danger of cracking his head or breaking his neck. To avoid accident, and to promote safety, a light is placed near the bottom of the cellar stairs, which, however, is controlled by a three-way switch, so that the current may be turned on either by the person descending the interior stairs, or entering from the exterior cellar-way. An additional lamp is given to the right of the furnace, locally controlled, and placed at such an angle as to illuminate the stoking operations, and yet set at such a distance as to avoid a blow from the end of the long-handled shovel usually prescribed for furnace tending. Behind the furnace and between it and the hot water tank is another bulb, locally controlled, and designed to give adequate illumination whenever it becomes necessary to examine dampers or to inspect water connections.

Coal and wood storage next receives attention; the bins for this purpose are located at the front of the cellar, generally the darkest portion, since it is seldom desirable to break into the design of the house front merely to locate cellar windows. The two bins are each lighted with a single bulb, usually placed against the ceiling and protected from injury by a wire guard. These lights are controlled from switches placed near the bin doors.

Equally deserving of attention is that part of the cellar which contains the laundry and which is located, in our illustration, to the left of the interior stair. This position is fairly well lighted from two cellar windows located along the rear wall of the house, but in the nature of the case, these will not be very large nor are they likely to be spotlessly kept. Accordingly the laundry should be given adequate artificial light to overcome these usual deficiencies. For this purpose, one lamp of fairly large wattage either placed against the ceiling, if it be low, or equipped with a good reflector, will be found both advantageous and economical. This light is shown switched from the laundry door. On the side wall of the laundry, one bracket lamp is also allowed placed so as to give additional light for both the ironing machine and the ironing board; this is suggested because a cellar ceiling is seldom high enough to avoid shadows if a central fixture above is provided.

The equipment of the laundry shown here is complete but not extravagant. Near one window stand the tubs, in front of which is indicated a washing machine, operated from a ceiling receptacle. Near this, and against the partition, is placed a small gas stove for the occasional boiling of laundry. Close to the second window is the ironing board, designed to be used with an electric flat iron, which can be operated from the same receptacle as that employed for the washing machine. If a hired laundress is employed, it will often pay, to prevent negligence in turning off the current, to have a switch placed right on the ironing board itself, as shown in the illustrations on wired furniture in the March 1 issue of this magazine. The "handy switches" to be installed on the flat iron cords are very satisfactory for careful people, but in the hands of the hired laundress are apt to be allowed to come in contact with the hot iron, to the destruction of the switch, and to the possible damage of the wiring.

The electric ironing machine, located next to the ironing board, is power driven from a ceiling receptacle to the right of the machine. These extremely useful machines, it must be remembered, are usually gas heated, except in those parts of the country that give especially low rates for electric heating. But as it is very inexpensive to run armored electric cable about a cellar, and bring it out where needed, it is also no very grave matter to run gas piping to the point of use for either a washing or an ironing machine,—for it is to be remembered that some washing machines have also auxiliary gas heaters.

The remaining cellar space shown is dedicated to a preserve and store closet, and to furnish a drying place for clothes in bad weather. No especial electric equipment is indicated for this for ordinary family use, except one light so placed that it will give sufficient light to anyone visiting the jam closet; this is noted as switched from the laundry partition, a provision made for convenience in getting a light amidst occasional confusion of clothes lines and wet garments.

It may seem to the reader that too generous provision has been made in this plan of cellar wiring. But again, let it be suggested that if economy is the motive, it would be better to save by omitting electric fixtures altogether in the cellar, and substituting bulbs hung from utility cords, as is done in most garages. This method of illumination may not be very handsome, but it will serve the purpose in a cellar, and will not interfere

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with the safety or convenience of people working there. Furthermore, in point of operation, these more numerous outlets, equipped for the most part with fairly small lamps, will be found more economical than a few large lights. This is because it is almost inevitable that cellar lights are left on when they ought to be turned off. The furnace men, the ash men, the meter readers, the grocery boys, the coal and wood men, the laundresses, who operate in our cellars are not going to be very careful about turning off our lights. For this reason, such a wiring scheme as indicated here, although it may look very liberal on paper, will frequently be found more economical in daily use than a wiring plan calling for a smaller number of outlets.

BUILDING CODE UNIFORMITY

A discussion of some of the reasons for existing differences in building codes illustrated by recent attempts to codify reinforced concrete design

SOME of the inconsistencies of American building codes relate to floor loads*; some to thickness of curtain walls carried on lintel beams in framed buildings of steel as well as of reinforced concrete; some to the inclusion of ideas and opinions of local material men and some, but not many, to honest differences of opinion of scientific and technical men. The differences however do not affect all of the population, for but few cities having a population under 5,000 have building codes: of the 1478 cities† with a population over 5,000 not more than 27 per cent are provided with any sort of regulations governing the construction of buildings. Some of these regulations do not govern design, some relate merely to the erection of buildings within arbitrarily defined "fire limits," and a lamentable number of municipalities have no proper methods to enforce such building laws as they have on the statute books.

The proposed uniform code now in the hands of a committee appointed by the Secretary of Commerce, should become a statute in each state when the work of the committee will be completed. In this way the regulation of building will not be longer a hap-hazard matter in less than three per cent of the incorporated communities in the United States. Of the 15,400 incorporated villages, towns and cities in this country only 2,800 have populations in excess of 2,500 but in them the total number of inhabitants amounts to 54,000,000. There are 12,900 rural communities with a total population of 9,000,000. Uniformity in building methods brought about by state laws will result in lessened costs, reduction in waste through ignorance and will tend toward greatly reduced fire losses.

The recent failure of the American Theater in Brooklyn, N. Y., and the Knickerbocker Theater in Washington, D. C., showed that neglect of duty on the part of building department officials nullifies the best drawn codes. The failures proved also that inspectors should be as well educated as are plan examiners. In fact plan examiners and inspectors should pass equally severe examinations and their duties should be interchangeable. In the cases above referred to it was shown that the plan examiners did their duty in checking submitted designs and requiring designers to follow safe practice; the inspectors acted independently of the plan examiners with disastrous results. The best laws are of no effect unless they are enforced by competent and honest men.

The design of structural steel is fairly well standardized. Differences creep in when ignorant men copy provisions from ordinances in nearby cities without properly adapting them to their local conditions. The differences seldom apply to fiber stresses and methods of design, but to floor loads, thickness of walls, etc. The use of wood in structural design is well standardized. Difficulties creep in because wood is a natural product and many local dealers are careless about following grading rules. Compilers of building codes have met the difficulty by specifying stresses which do not please the lumber manufacturers. A satisfactory solution is the branding of one structural grade by representatives of a national organization. A beginning along this line has been made.

Cast iron is an old material far superior today to the cast iron of a generation ago. In localities where much cast iron is made it is better treated in building ordinances than it is in localities in which manufacturers of steel are well intrenched. Freight rates, low strength per pound of material

* *The American Architect, Jan.* 18, 1922.
† *The American Architect, Oct.* 12, 1921.

as compared with steel and difficulties in framing place limitations upon the use of cast iron.

Fire underwriters exercise a potent influence and must be recognized in all standardization of building codes. Their work relates merely to the structural portions of a building and possible damage by fire. The underwriters are blamed for thick curtain walls carried on lintels, the effect of the loading being felt in columns and foundations. They are blamed for objecting to some forms of structural tile and hollow concrete blocks, their fear of the effects of unequal contraction and expansion making them very conservative. They cannot be blamed for excessive floor loading requirements, being on record in that respect in a complete building code, the first edition of which appeared in 1905.

Health officials join with fire underwriters, architects and engineers, in preparing building regulations and the sanitary aspect yearly becomes more important. In some places organizations of plumbers are said to have obtained laws which unduly increase the cost of plumbing; in other places, under the leadership of sanitary specialists, the requirements are quite simple and much is being learned about the real value of all that pertains to a proper system of sanitary house drainage.

For years it has been believed that a standardized building code would greatly help the building industry. The American Institute of Architects after wrestling long with the problem decided that public spirited professional men could not devote the necessary time to the preparation of a code to be effective throughout the United States. The recommendation was made that it was work which should be done by the Bureau of Standards. Secretary Hoover appointed a committee of men representative of the organizations having most at stake in the matter and the Bureau of Standards is doing much of the necessary experimental work.

At this time the concrete specialists arrive with recommendations and the question arises as to whether a building code for the United States can be specific on all materials and on all items affecting their assemblage. In 1916 the Joint Committee on Concrete and Reinforced Concrete issued a final report. It was stated by the committee that the report was not a specification but formed a basis for a specification. A new committee was appointed to prepare specifications, that is building code requirements and a progress report was rendered in August, 1921; which report was discussed at a meeting held in New York on December 7 and 8, 1921. It was recently cited in a report made to the last annual meeting of the Concrete Institute, as showing the need of uniformity in building codes.

A committee of five engineers, specialists in reinforced concrete design and construction, estimated the cost of a hypothetical building 80 x 300 ft., six stories in height, no basement, the first floor being on the ground. The roof load was 40 lbs. per sq. ft., live load, and the weight of the roof and cinders was 30 lbs. per sq. ft. The building was calculated for both flat slab and beam and girder construction, using live loads in common use, according to the New York City code and the proposed Joint Committee specifications.

The Concrete Institute Committee on Reinforced Concrete Building Design and Specifications, A. R. Lord, Chairman, extended the work to include other cities. The following distribution of costs of component parts of a concrete building was arrived at, as an average:

	Flat Slab Building	Beam and Girder Building
Floors and roof	65%	68%
Tied columns	8%	9%
Spiral columns	12%	11%
Footings	13%	10%
Walls, etc. of concrete	2%	2%
Total	100%	100%

The committee stated the costs covered in their report may be taken roughly to represent about 20% of the cost of the completed building, being for steel and concrete only in place.

The result of the analysis of the costs gave somewhat surprising, not to say disconcerting, results. The costs of all materials were identical in each case, the differences in total cost being due to matters of purely engineering detail found in the codes and specifications named. In the original table the cost ratios of the Joint Committee specifications to other specifications are reciprocals of the cost ratios given in the table below. The form here given is believed to be more simple as the intention is not to criticize the Joint Committee specification but to use it as a basis of comparison of costs with specifications in daily use.

Reinforced Concrete Cost Ratios

Code or Specification	Flat Slab Building	Beam & Girder Building
Joint Committee (Base)	100	100
Am. Conc. Inst. 1920	92	111
Chicago	97	115
Philadelphia	98	135
Cleveland	102	147
New York	90	100
Detroit	89	102
Cincinnati	81	91
San Francisco	98	110

Until a uniform building code is prepared for the whole country the use of the Cincinnati requirements for reinforced concrete design should

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be popular with competitive designers, for buildings to be erected in the thousands of municipalities not at present provided with building regulations.

Assuming that care was taken to select for membership on the Joint Committee none but those best fitted to prepare specifications for reinforced concrete design puts engineers in a defensive position. The uniformly higher costs for beam and girder buildings, except for Cincinnati, may be taken to indicate that steel salesmen had considerable influence when the codes were drawn. No patents were involved and the adopted specifications helped the sale of reinforcing steel. The design of beam and girder buildings might very well follow the Joint Committee specifications and thereby make a material saving in cost in each of the cities mentioned.

The uniformly lower costs for girderless slabs indicate that owners of patents for this type of construction were much in evidence except in Cleveland, when the codes were drawn. An easy solution of the difficulty would be to throw out Cleveland, the highest in cost, Cincinnati, the lowest in cost and, by averaging the others produce a compromise specification. This would be in harmony with the way building ordinances are usually drawn.

Structural Steel for Buildings

THE Building Code Committee of the Department of Commerce, Ira H. Woolson, chairman, states that that committee desires to secure individual expressions of opinion concerning proposals that have recently been made to modify building codes throughout the country by permitting higher unit stresses in the design of structural steel units in buildings. The committee will not make public the names of persons offering suggestions. Communications should be addressed to the Building Code Committee, U. S. Department of Commerce, Washington, D. C.

Plastic Wood

A PLASTIC wood composition is the latest addition to the list of materials valuable in building construction. It is reported to be composed of a nitrated cellulose dissolved in amyl acitate and other solvents and kneaded with finely ground wood meal. It resembles putty or modelling clay and can be readily molded into any desired form. Tenacious in character and capable of adhering to almost any surface except a greasy one, it dries within a few hours to a hardness similar to pear wood and can then be worked like real wood. Because of its plastic condition in the making it can be used in such various ways as pattern making, crack filling, and repairing damaged pieces. It is made in England.

New Wood Preservative

A RECENT development is a new wood preservative, a mercury derivative, an anhydride of oxymercuric acid. Only 0.01 to 1 per cent of the preservative is required to give good results. It appears that on exposure to air, the wood treated in this way becomes impregnated with very powerful insoluble mercury salts which effectively prevent the decay of the wood. The addition of soda ash and other alkaline salts helps this action along. In admixture with such preservatives as copper sulphate, lead acetate and zinc chloride, the disinfection of the wood is even more complete.—*Industrial Digest.*

COMMUNICATIONS

Electricity in the House

The Editors, THE AMERICAN ARCHITECT:

REFERRING to article on The Modern Kitchen in the April 12 issue, pages 324-5-6.

There should be a switch for bracket light over sink. To stand in splashed water and turn a key with wet hands might be hazardous. (Code requires switch).

If modern electrically, it should be modern in all respects; hence, table should be nearer range. Range should have smoke flue, hood and vent flue. (Flues should *not be omitted*). Sink should have *double* drain boards. Dish-washing machine may not be used when there are but few dishes to be washed, or, if it is, a left hand board is mighty handy for removing, sorting and rinsing.

It being an even chance that the ice-box will not be an electric one, it should be located on kitchen porch or just inside the door from porch to save dripping and tracking. Better to put ice-box under high window to porch and ice it from outside.

Of course this is idle, as any woman would rearrange such a kitchen after the first day's use.

N. BLAISDELL.

San Francisco, Calif.
May 4, 1922.

The Fowler Tavern Door

Boilers
Mills Water Tube
Smith with Smokeless furnace
Smith without smokeless furnace
W17 Smith Service
Menlo
H. B.

THE traveler on the old Post Road from Albany to Boston was well advised if he spent the night at the Fowler Tavern, Westfield, Mass., one of the principal stations on the way. The Fowler Tavern, built about 1755, is situated on Main Street, a short distance below the site of The H. B. Smith Company, Pioneer Manufacturers of Boilers and Radiators. Washington was among the famous guests who passed through the Tavern Door to enjoy the bounteous hospitality of mine host. The Door is an unusual example of Colonial architecture and is now on exhibition in New York City at the Metropolitan Museum of Art.

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THE AMERICAN SPECIFICATION INSTITUTE

Member of The American Society for Testing Materials

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THE Board of Governors represent memberships in the following national societies: American Institute of Architects; American Society of Civil Engineers; American Society of Mechanical Engineers; American Institute of Electrical Engineers; American Society for Testing Materials; American Concrete Institute; American Iron and Steel Electrical Engineers; which indicates the scope of activities of The American Specification Institute.

THE American Architect and the Architectural Review has gratuitously set apart this section for use by The American Specification Institute. The Editors and Publishers assume no responsibility for any statements made, or opinions expressed.

The purpose, simply stated, is to afford an organization which, it is believed, will become a most important element in architectural practice and building operations, a medium through which it may, without expense to itself, reach a class of readers that are most intimately identified with the field of the activities of The American Specification Institute.

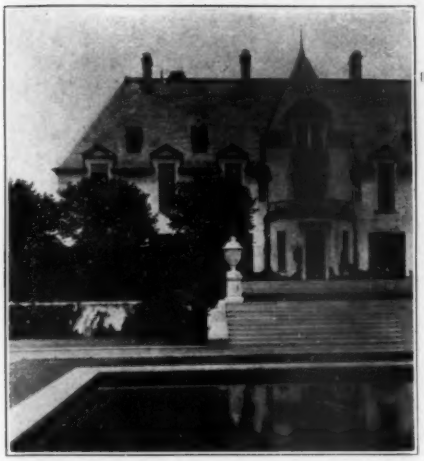
Publishers, The American Architect and
The Architectural Review.

Using the Yard Stick

SINCE the issuance of Bulletin No. 5 several members have submitted analyses of specifications they have made in accordance with the principles set forth. The judgment that the "Analysis of a Specification" would indicate a most valuable means of weighing the basic phases of a specification thus seems to have been confirmed in a gratifying manner. The significance of this "Analysis of a Specification" must be recognized before the fundamental requirements of a specification can be determined and it is only by a study predicated on this method that the writing of specifications can be improved in a scientific (and consequently correct) manner.

One of the members has submitted the following study and suggests that "the foundation of all good specification writing is the proper arrangement of the contents of the divisions which go to make up the body of the specifications."

Definition	Statement, if any
Substitutes	The specialties particularly named in this specification shall be considered as standards. Bids on proposed substitutes of like characteristics and value are invited but substitution will be authorized only on the ground of unquestioned betterment, price concession or availability. Bidders on this work must base their bids on the specialties named. Substitutes must be offered as an addenda to the original bid.
Contract Documents	Read and comply with the General Conditions prefixed to this specification (See Pages 1 to 9 inclusive).
Legal	Reference as to permits, regulations, codes, royalties and patents, standards, etc.
Work Omitted	Mention any work usually done or material usually furnished which is not to be included under this division of the general specification, such as work, material, or apparatus provided by the Owner or by others; or material or apparatus provided by the Owner or by others but set or placed by this Contractor.
Not Included	(Very important).
Owner Provides	(To avoid "extras").
Now Under Contract	(To prevent conflict of authority).



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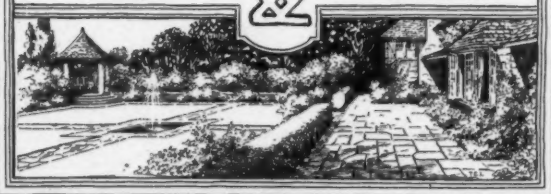

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WORK REQUIRED — Brief, accurate, clearly expressed description of characteristics necessary to accord with service conditions encountered and ultimate requirements (results).

PREPARATION — Field measurements, shop drawings, samples, models.

MATERIALS — Chemical and physical properties, sizes, weights and gauges, quantities.

METHODS — (Or results) Processes, shop and field working, finish, co-operation with other contractors, protection of work.

SCHEDULES — Schedules of operation, delivery and completion, marking and shipment.

RESULTS — Inspection and performance, guarantees, tests, rejection.

FROM NEW ZEALAND

Mr. Norman Reid Lightbody, our member in Christchurch, New Zealand, has sent a letter which says, in part, "Your bulletins on concrete have been most helpful. I used several of the suggestions in a concrete job recently and have every reason to be glad I did so."

PURPOSE AND OBJECTS OF THE INSTITUTE

The architect or engineer who is responsible for the design and construction of a building or engineering structure must be intimately acquainted with a vast number of materials and processes and, as his knowledge of these, and his skill in their use, are increased he finds his object more easy of accomplishment. The person who writes specifications for such structures must have a thorough knowledge of the subject matter of the various subdivisions of his specification and since the average mortal cannot hope to learn, through personal experience, all he must know in order that he may achieve success he must look to some source or sources of authoritative information for assistance. The American Specification Institute has been organized to act as a clearing house for specification data and to assist its members in producing specifications of the best quality.

The "Plan and Scope" of The American Specification Institute is divided into five sections, as follows:

1. Purpose
2. Benefits To Be Obtained
3. Membership
4. Organization
5. Activities of Organization.

The preamble to the "Plan and Scope" is as follows:

"As heretofore produced specifications have been largely the product of individual effort and as such have varied in many features that can be conventionalized so as to be common to all. Owing to a present lack of means for collecting and distributing information concerning specifications and the writing thereof, there is a needless duplication of study, research and labor on the part of specification writers. Practically all other professions are so organized that the interchange of knowledge is effected with resulting improvement in the quality of production and professional standing. It is to improve the conditions affecting the writing of specifications and to benefit by organized effort that THE AMERICAN SPECIFICATION INSTITUTE is organized. This organization is intended to be national in scope and invites co-operation of all those interested in specifications."

The restrictions placed on membership, namely that each candidate must be engaged, to some degree, in specification work for building and engineering structures assures a membership with a single purpose—the study and improvement of specifications—and, it is hoped, precludes the giving of attention to extraneous matters that might occur if the interests of the members were of a diverse character.

Department of Specifications

(Continued from page 486)

appearance on the market of a large number of compounds having the express purpose of obviating these objections. The compounds are of a proprietary nature and the composition is kept secret by the makers. The designer not familiar with them should make his selection of material only after carefully investigating their merits.

Where any expensive work is to be undertaken and the employment of any of these compounds is contemplated, tests should be carried on to determine:

1. The effect on the strength of the concrete
2. Their behavior when subjected to extreme ranges of temperature
3. Their immunity to decomposition by various acids, etc., liable to reach the concrete
4. The effect of admixture of the materials to steel embedded in concrete.

WORKMANSHIP—As previously stated, the treatment may consist of adding waterproofing material in the body of the concrete or in a coating or plaster applied to the surfaces to be protected. In either case the essential requirements for good work are homogeneity of mixture, continuity of work, and soundness or freedom from cracks, etc. When used as a surface coating, a uniform and efficient bond to concrete or masonry surface must be secured.

And Now— The Barrett Specification Roof!

FROM corner-stone to cornice, the modern structures that house the nation's business are built to endure. The foundations rest on bed rock. Steel frame-work and steel girders support the weight of walls and floors. And when they are ready to be roofed the great majority of them are covered with Barrett Specification Roofs.

That these roofs should be the almost unanimous choice of owners and architects of such buildings, is not surprising when you consider—

That we can name many roofs of this type in good condition after forty or more years of service. Their durability is *proved*, not estimated.

Cross-section, actual size, of Barrett Specification Roof

That they are *bonded* against maintenance expense. Barrett Inspection Service *during construction* insures strict compliance with the roofing specifications, and a Surety Company Bond absolutely protects the owner from all roof repair during the bonded period.

That moderate first cost and guaranteed freedom from maintenance make them the most economical roofs it is possible to build.

That they provide a degree of fire protection not exceeded by any other roof. They always take the base rate of fire insurance.

The Barrett Specification Type "AA" 20-Year Bonded Roof represents the most permanent roof covering it is possible to construct, and while we bond it for twenty years only, we can name many roofs of this type that have been in service over forty years and are still in good condition.

Where the character of the building does not justify a roof of such extreme length of service, we recommend the Barrett Specification Type "A" Roof, bonded for 10 years. Both roofs are built of the same high grade materials, the only difference being in the quantity used.

The Surety Company Bond, absolutely protecting the owner from maintenance expense, is issued free of charge on Barrett Specification Roofs of 50 squares or larger, in towns of 25,000 or more, *and in smaller places where our inspection service is available.*

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Sulgrave Institution to Get Painting of Washington Manor

STEPHEN REID, R. A., a Scottish painter, brought over from Liverpool a painting, 3x4 feet, of Sulgrave Manor, the ancestral home of George Washington, which he will present to the Sulgrave Institution in this country.

The painting will be taken to Washington officially to be received in behalf of the Institute by President Harding.

Art School Opens in Paris

THE New York School of Fine and Applied Art announces the opening of its new building in Paris at 9 Place des Vosges. Thus is realized, according to the officials, the aim to offer its members a type of international service unique in conception.

The courses will be arranged to serve professional workers in interior architecture and decoration, stage and costume design and advertising. The Paris school will feature a course given by Frank Alvah Parsons for professional men and women.

It is proposed to show a selected exhibit from the New York and the Paris school at the Art Center, 65 East Fifty-sixth Street, New York, this fall.

$17,000,000 Soldier Hospital Measure Passed by House

THE $17,000,000 soldier hospital bill making immediately available $12,000,000 for beginning construction of institutions in twelve of the fourteen veteran bureau districts, was recently passed by the House. It now goes to the Senate. It was reported by Chairman Madden of the Appropriations Committee that the measure was put through by unanimous vote.

Hungarians Erect Monument to American Red Cross Chief

THE first European statue to a living American has recently been erected by Hungary in honor of James A. Pedlow, American Red Cross Commissioner. It is situated in the municipal park, Budapest, near the Washington memorial.

New York Society of Architects Elects

AT the recently held annual meeting of the New York Society of Architects, the following officers were elected: President, James Riely Gordon; first vice-president, A. E. Fischer; second vice-president, Edward W. Loth; secretary, Arland W. Johnson; treasurer, Henry Holder; and financial secretary, W. H. Volckening.

International Engineering Congress in Rio de Janeiro Planned

AN International Engineering Congress is being planned to be held at Rio de Janeiro in connection with the Centennial Exposition which is to open there next September to celebrate the One Hundredth Anniversary of the Independence of Brazil. Under the direction of the Engineers' Club of Rio de Janeiro preparations are now being made for the congress, and it is understood that representative engineers from all American countries will attend.

National Lime Convenes June 14

THE National Lime Association is working on plans for its next annual convention which will be held in Cleveland, Ohio, June 14 to 16, at the Hotel Hollenden.

Paris Plans Moving Sidewalk

IN order to relieve the congestion of traffic in Paris streets, pertaining mainly to the central boulevards, it has been proposed to install a system of moving sidewalk which would facilitate the movements of pedestrians.

The plan, project or theory at first was regarded with amusement or skepticism, but it appears that the Municipal Council is treating the matter seriously, as it has decided to open a prize contest for the best solution of the problem.

Prizes of 100,000, 50,000 and 30,000 francs are offered for the best propositions.

The contest is open to foreigners, subject to the approval of the administration, and the contestants must make special demand to the Préfet de la Seine at least three months before the close of the contest.

Germans to Clear Buildings of All Monarchical Insignia

ALL insignia of monarchical Germany must be removed from public buildings, according to a statement issued by the German Minister of the Interior. A definite period will be fixed by the German Government, within which this decision will have to be carried out.

Exceptions will be made only where these emblems have been structurally incorporated in buildings where their removal would destroy the architectural value and effect.

All paintings, busts and statues in Goverment offices must also be removed if their retention is incompatible with the Republican régime. This order will chiefly apply to portraits of former Emperor William, although, as stated heretofore, exceptions might be made if their removal destroyed the "artistic and historical unity" of the interior decorations.

This immense apartment hotel at 290 Park Ave., New York City, required elevators which would meet the exacting needs of a refined tenantry.

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Architects

"Ideal" Elevator door hardware was selected for use after the most severe tests and rigid comparisons proved its superiority in every possible way.

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Practically every American city has its quota of modern buildings in which the elevators are equipped with Richards-Wilcox "Ideal" Elevator Door Hardware.

But it is particularly noticeable that New York, America's largest city and generally conceded to be the most progressive city in the world, is fairly covered with immense modern structures wherein only "Ideal" elevator door hardware is to be found.

Among the several reasons for the general use of "Ideal" hardware is its splendid finish, its perfect construction, which results in easy, noiseless operation, and its durability. The "Ideal" controller in closing the elevator door, starts easily and closes the door completely with the same motion. There is no banging of the door when released.

Our latest catalog of "Ideal" Elevator Door Hardware is complete in every detail. It is a very valuable addition to any architect's library. May we send you a copy? Ask for Catalog D-21.

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"Slidetite" garage door hardware is well and favorably known by most architects. If you are not familiar with it, let us tell you about it.

PERSONALS

Oscar Vatet, architect, has moved his offices to 565 Fifth Avenue, New York City.

Meyer J. Sturm, architect, announces the removal of his office to 232 East Erie Street, Chicago, Ill.

Geo. J. Lobenstein has opened an office for the practice of architecture at 859 Flatbush Avenue, Brooklyn, N. Y.

David Podoloff, architect, has moved his office from 865 Chapel Street to 129 Church Street, New Haven, Conn.

Lee & Hewitt, engineers and architects, announce the removal of their offices to the Dodge Building, 53 Park Place, New York City.

It is announced that Gregory Burkitt Webb, architect, has moved his offices to the Winfield Building, 469 Fifth Avenue, New York City.

William C. Presto, architect, announces the removal of his offices to Suite 726, Conway Building, 111 West Washington Street, Chicago, Ill.

Malcolm MacGregor Kilduff has opened an office for the practice of architecture at 197 St. Mark's Place, New Brighton, Staten Island, N. Y.

W. Henry Mayer, architect and engineer, has moved to his new and more spacious offices in The Regis, 3327 Montgomery Road, Cincinnati, Ohio.

Announcement is made that Keith Cheetham is the winner of the Chicago Architectural Club's Annual Foreign Traveling Scholarship for the year 1922.

T. Ralph Ridley, architect, formerly at 502 Ohio Building, has moved his office to the Federal Oil and Gas Building, 109 N. Union Street, Akron, Ohio.

Charles Downing Lay, landscape architect and town planner, announces the removal of his office to the Architects' Building, 101 Park Avenue, New York City.

Edward P. Rupert, architect, 19 S. LaSalle Street, Chicago, Ill., has expressed a desire to receive manufacturers' catalogs and samples of interest to architects.

Richard E. Schmidt, Garden and Martin, architects, announce the removal of their offices from the eleventh to the fifteenth and sixteenth floors of the Monroe Building, 104 South Michigan Avenue, Chicago, Ill.

Fred J. James, architect, announces the opening of his enlarged offices in the Citizens Bank Building, Tampa, Fla. Manufacturers' samples and catalogs are desired.

Theo. Steinmeyer announces the opening of an office in the Title Guaranty Building, St. Louis, Mo., for the practice of architecture. Manufacturers' catalogs and samples are requested.

C. Muhs, architect, announces that he has opened an office for the practice of his profession in the Karnak Building, Dinuba, Cal. Manufacturers are requested to send catalogs and samples.

Weeks & Day announce the removal of their offices from the Phelan Building to the California Commercial Union Building, 351 Montgomery Street, San Francisco, Cal., where they will continue the practice of architecture and engineering.

Layton Allen and Hubert M. Garriott have become associated in the practice of architecture under the firm name of Allen & Garriott, architects, with offices at 401 Lombard Building, Indianapolis, Ind., and 4 Masonic Building, Logansport, Ind.

H. Ralph Hadlow, former vice-president and general manager, and Noel H. Hick, former director and engineer in charge of building design, announce their withdrawal from The Watson Engineering Company, and the formation of Hadlow, Hick & Company, engineers, with offices in The Finance Building, 750 Prospect Avenue, Cleveland, Ohio, for the practice of their profession.

Professor Harry Sternfeld, Acting Head of the Department of Architecture, at Carnegie Institute of Technology, Pittsburgh, recently received a medal and diploma awarded by the Pan-American Congress of Architects that met in Montevideo, Uruguay. The award was made in recognition of work done by Mr. Sternfeld in the field of architecture.

James Chillman, Jr., has recently been appointed Assistant Professor in Architectural Design at Carnegie Institute of Technology, Pittsburgh. Mr. Chillman, for the past three years, has been studying at the American Academy at Rome, as the holder of the Roman Prize Fellowship. His work at Carnegie Tech will begin next September. He is a graduate of the University of Pennsylvania, Class of 1914, with the degree of Master of Arts. For some time he was an instructor at the University of Pennsylvania, and for several years was instructor in architecture at the Rice Institute, Houston, Texas.

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FROM THE ORIGINAL SKETCH BY WILLIAM MITCHELL KENDALL